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Herpes Zoster and Angina Pectoris

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FROM a clinical point of view Herpes Zoster may be readily confused with Angina Pectoris, especially when it occurs in the middle age periods. Mackenzie has pointed out that herpes zoster which develops as a result of ganglionic disturbance of the first four upper thoracic segments of the spinal cord may resemble in every respect the rather characteristic syndrome seen in true angina pectoris.

Other authors have found a very close association between herpes zoster and angina pectoris of the neurogenic type. Some have stated that the two diseases are manifestations of the same etiologic background, while others believe that angina pectoris may be the result of herpes zoster itself. The situation is further complicated by the fact that herpes zoster may follow after an attack of angina pectoris. A consideration of these apparently contradictory opinions may be due in part to the fact that the pathways concerned in the neurogenic arc utilized in both conditions may be the same.

There have recently been many demonstrations of the nerve pathways involved in carrying the pain sensations in angina pectoris. Several authors have been able to point out zonal areas of the skin which are directly associated by complex neuron connections with the cardiac plexus and the ganglionic elements themselves. Angina pectoris of the neurogenic type must be sharply differentiated from the anginal seizures which are the result of stenocardia, whether of the functional or of the degenerative coronary arterial type. In this latter group considerable pathology of the heart is usually found; coronary thrombosis, myocardial infarction, sclerosis and aneurysm of the heart or great vessels are common postmortem findings.

Angina pectoris of the neurogenic type, on the other hand, presents no such changes in the heart. Indeed, the heart may be entirely "normal" in cases which have clinically had frequent severe anginal seizures. Every pathological laboratory can demonstrate three types of cardiovascular change: first, those who had a history of anginal attacks with extensive coronary arterial change; second, those with a similar history but with normal hearts and blood vessels; and third, those without anginal history with marked coronary and myocardial disease. Cabot, for example, in a series of 138 cases had 33 cases of the first group, 11 of the second, and 94 of the third. There is apparently thus no close connection between the intensity and severity of the

anginal seizures and the pathologic physiology occurring in the cardiovascular system.

Probably no subject has been as fruitful of academic speculation within the past decade as the anginal syndrome. The bibliography is replete with innumerable theories in regard to the various phenomena associated with this condition. In the last analysis, however, very little of fundamental importance has been added to the original description by Heberden and to the theory of its cause by coronary involvement described by Jenner in his memorable letter to Heberden concerning Hunter's illness. All this transpired at the close of the eighteenth century, and in the 200 years which have followed, neither of these observations has been materially shaken. Important contributions have, however, been made by Allbutt, Vaquez, Potain, Mackenzie, Stokes, Wenckebach, and Danielopolu which have clarified this difficult clinical syndrome.

The division of the anginal picture into the stenocardial and neurogenic types has received almost universal acceptance; confusion still exists in regard to the association between these two groups and also in regard to the development of the stenocardial group from the neurogenic type. In this connection, we have been interested in a series of cases which have clinically been diagnosed as herpes zoster and which subsequently developed a characteristic stenocardial picture and died from coronary artery disease with its associated myocardial breakdown. Three of these cases were followed closely over a period of five years; they were seen first during or immediately after an attack of shingles. They were studied from a cardiovascular angle, not because of the herpes zoster, but because they had been complaining of heart consciousness.

At the time of the first examination rather normal cardiovascular findings were noted; electrocardiographic tracings, X-ray examination, blood pressure readings, vital capacity estimations, and function tests were made. In periods varying from six months to three years, these patients began to suffer from typical anginal seizures of varying degrees of severity. Detailed cardiovascular surveys made from time to time showed the onset and progressive nature of certain vascular degenerative changes. Two of the cases had more than two attacks of herpes zoster, but all three of the cases retained and exhibited the tender points of the head zonal areas described by Mackenzie. A detailed description of each case is presented below.

Case 1. B.P., Age 54. Was seen on November 3, 1923. Her previous cardiovascular history was essentially negative; her family physician had known her for about 20 years during which time he had treated her only for her pregnancies and once for influenza. During the latter part of October, 1923, she began to complain of sharp burning pain in the left chest, especially in the axillary line. The pain was very severe; the family physician x-rayed her chest suspecting a pleurisy but the roentgenograms were negative. The heart in this picture was rather normal for this age period. In about ten days the characteristic skin lesions of shingles broke out. The patient was carefully examined for possible foci of infection, and one abscessed tooth was removed. Shortly after this the patient complained of palpitation and dyspnea and was referred to us for cardiovascular study.

When seen on November 3, 1923, she

still had five small skin lesions located in the midaxillary line at the level of the fourth and fifth ribs. The skin over this entire area was hyperesthetic. Electrocardiographic studies showed rather normal tracings (Figure 1A). There was a sinus rhythm with a moderate left axis deviation of the heart which at this age period may be considered as normal. Her other tests were also normal for this age group.

The skin lesions of herpes zoster slowly cleared up and disappeared in about six weeks. The patient was seen again on October 17th, 1925. In the two years which had intervened she had had three separate attacks of herpes zoster, all on the left side and all within the head zone areas supplied by the three upper thoracic ganglia. The last attack occurred during April, 1925. During that summer she began to experience substernal discomfort on exertion and twice she had what appeared to be true anginal seizures with pain which radiated down the left arm to the elbow.

Cardiovascular examination made at this time (Figure 1B) showed in addition to a more marked left axial deviation of the heart alterations of the T-waves in the second and third leads. Orthodiagraphic X-ray examination indicated a slight increase in the diagonal diameter of the cardiac shadow. Her blood pressure remained the same. A diagnosis of coronary artery disease was made and the patient was placed on moderately large doses of diuretin after the method described by Moon at the National Hospital for Heart Diseases in London.

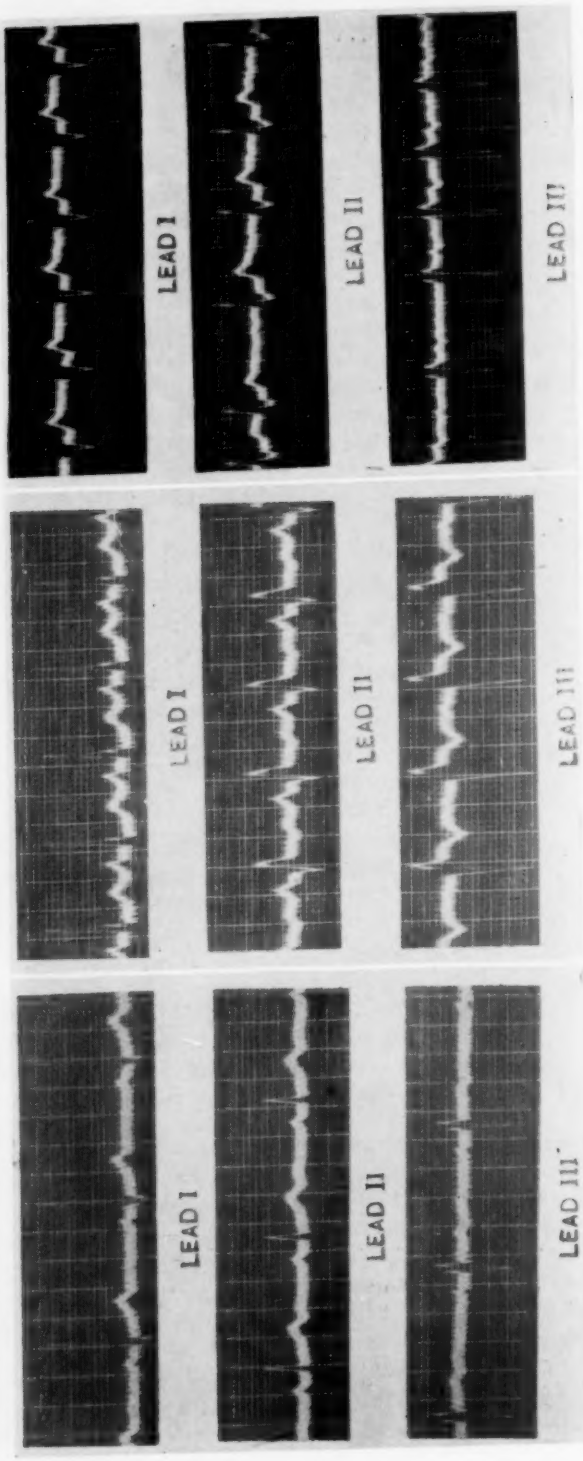
The patient continued to have her anginal seizures and except for a few months' remission during the spring of 1926 she continued to suffer from stenocardial attacks even upon the slightest exertion. She was seen from time to time during the next year and a half. Repeated electrocardiographic tracings showed the development of coronary sclerosis and, finally on March 6th, 1928, she was seized with an attack which was diagnosed as coronary thrombosis with infarction. She remained in this status anginosus for about ten days with a slight rising temperature, moderate leucocytosis, poor and thready pulse, which at times was grossly irregular and suggested either auricular fibrillation or an extrasystolic arrhythmia. The heart sounds for a few days were practically inaudible.

Her convalescence was very slow; she was electrocardiographed on May 21st again (Figure 1C) and a well established auricular fibrillation with left ventricular extrasystoles was found. The orthodiagraphic X-ray showed but slight cardiac enlargement. The tender points in the axilla and down the inner surface of the left arm were still present and the patient frequently complained that even the shoulder straps of her undergarments were at times unbearable on the left side. The patient from this period on did not respond to treatment and on July 10th, after a rather mild attack died before medical attention could be secured.

Case 2. H.W., Man, aged 57. Was seen first on September 4, 1925, about three weeks after he had recovered from a very severe attack of herpes zoster. The scars of the lesions could still be seen running in the characteristic zonal fashion along the course of the third, fourth, and fifth ribs on the left side. The skin over this area and extending down as low as the sixth interspace was hypersensitive. The patient said that he had been having a "heavy sensation" over the chest for the past week and had been advised to have his heart examined. So far as he knew, he had never had any heart trouble; he had passed an insurance examination about five years before.

Cardiovascular studies showed that he had a blood pressure of 145/95, his heart was normal in size but the aortic shadow was somewhat widened. The heart sounds were of good quality and no murmurs were heard. Vital capacity tests were normal. Electrocardiographic tracings (Figure 2A) were essentially normal for this age period.

During the summer of 1926 he again had an attack of herpes zoster which, however, lasted only about two weeks. He was not examined at this time as he was in another city, but on October 10th, 1926, he was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again studied; he had no complaints except that of insomnia. Even large doses of sedatives failed to produce the desired effect. His physical examination at this time also failed to reveal anything of importance. The electrocardiograms were similar to those taken a year previously.

On February 7th, 1927, during his convalescence from an attack of septic sore throat he experienced his first anginal attack. The pain while not very severe seemed to have localized itself in the same area as that involved by the previous two attacks of herpes zoster. Indeed, the patient himself believed that he was going to have another attack of shingles. It was impossible to examine the patient until about a month later; he was somewhat confused at this time in regard to the pain. He said that it resembled the burning pain of herpes zoster in exactly the same place that he had previously experienced. The pain now, however, seemed to come on in attacks which lasted only a few minutes and which he thought were connected with something which he had eaten, as he usually experienced the pain after breakfast. He had been looking for the skin lesions which he had learned to dread, but they had not appeared. The skin over this area while not as hyperesthetic as previously was still more sensitive than the skin on the right side of the chest.

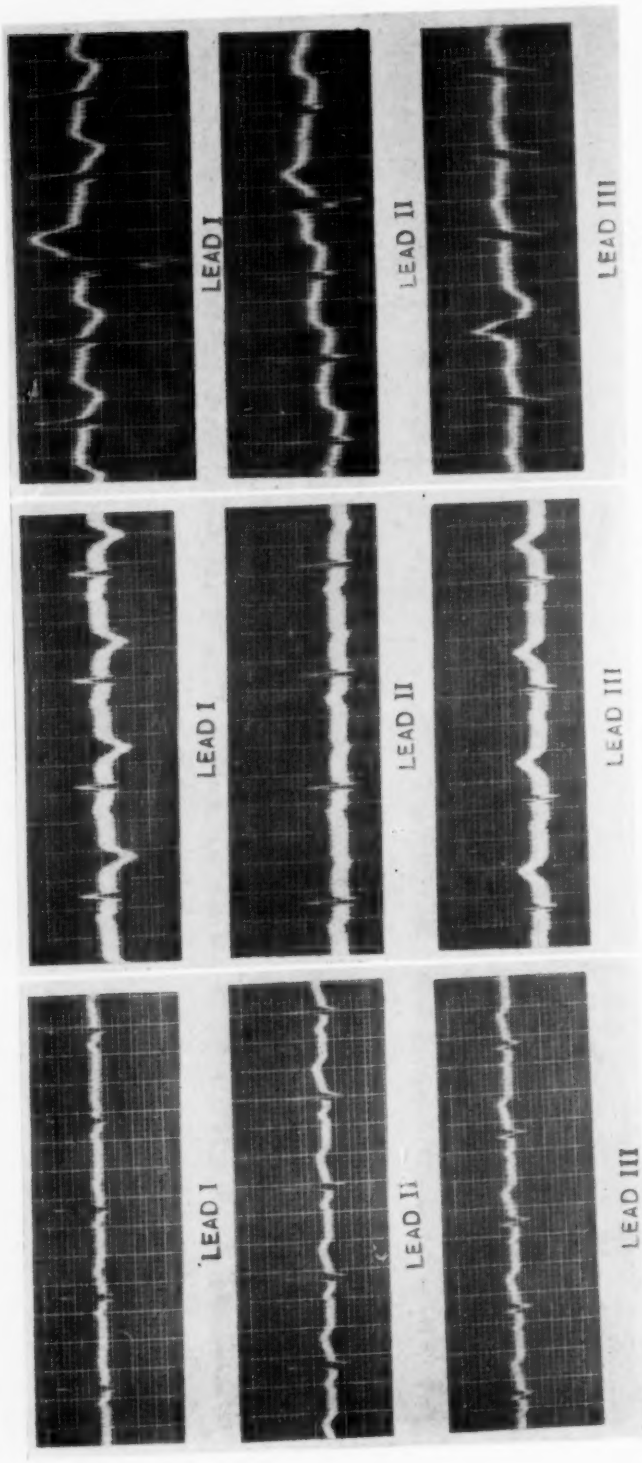
Examination at this time showed progressive cardiovascular pathology. The heart was considerably enlarged, his blood pressure had fallen to 95/65, and his electrocardiographic tracings (Figure 2B) showed alterations of the T-waves in Leads I and II. He had a normal sinus rhythm. Under a regime of enforced rest, abstinence from tobacco and the giving up of his occupation of traveling salesman he seemed to have improved and was only seen by us again fourteen months later.

On April 9th, 1928, he returned to the city and was examined again. We were struck with the marked change in the appearance of the patient; he had lost about twenty-one pounds in weight and looked pale, haggard, and drawn. He had been having repeated anginal attacks and the insomnia which he had suffered in 1926 had returned; he thought that it was due this time to his anginal attacks which occurred even while in bed. He had been using nitroglycerin for some time but with diminishing effect.

Electrocardiographic tracings (Figure 2C) now showed characteristic T-wave alterations in the significant leads; there were also many ventricular extrasystoles arising from different foci. The heart sounds were poor and distant. The patient had relatives in the West and was advised to visit them for a prolonged rest. He was not seen again but we received frequent communications from him. It appears that he did very well symptomatically for a few months. In November, 1928, he had a very severe anginal seizure. which confined him to bed for about six weeks. He was said to be in extremis a few times; he rallied, however, and on January the 10th, 1929, he wrote saying that he had almost entirely recovered and was planning to return East. On March 7th, 1929, after a series of anginal attacks, he died suddenly.

Case 3. D.K., man, aged 46. Seen for the first time December 7, 1925. He had been annoyed from time to time for the previous six months with peculiar burning pains over the precordium, axilla, and inner aspect of the left arm. He said that he had noted a "rash" at intervals in the same area but paid no attention to it; he had come to believe that these pains were due to his heart and although he had been repeatedly told that his heart was normal, he had developed a cardiophobia.

A complete cardiovascular study revealed nothing of interest. His electrocardiographic tracings (Figure 3A) are presented merely for comparison with subsequent records. The skin over the area complained of showed nothing unusual; no lesions of any kind were seen at that time; skin tests, however, showed a definite hyperesthesia. The patient was not seen again for three years. On November 17th, 1928, he appeared again; he said that he had had two attacks of shingles on the left side, one of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them in the spring of 1926, and another attack in the Fall of the same year. The first attack was apparently the most severe; he had numerous skin lesions, which required six weeks to heal, but occasionally since the second attack he had been having similar pains in the same areas. He noted that in the past few months that these pains would come on while walking or climbing stairs; his occupation was that of insurance adjuster, and he was forced to climb many flights in a course of a day's work. The pains were becoming so severe that it was a question of giving up his work entirely. He said that these pains resembled in many respects the pains which he had suffered during his two attacks of shingles.

Cardiovascular examination revealed no great change either in the size or contour of his heart, his blood pressure, however, has risen to 160/90, and he had a slight trace of albumin in his urine with a few granular casts. Electrocardiographic tracings (Figure 3B) showed that marked changes had taken place since the last examination. He now showed a marked left axial deviation of the heart with T-wave alterations in first and third leads suggestive of beginning bundle branch block. Under intensive euphyllin therapy and complete rest he seemed to improve symptomatically.

He was not seen again until September 11th, 1929, at which time he presented all the signs of advanced coronary disease. His stenocardial attacks were occurring at irregular intervals and the pain factor was becoming less important than that of the dyspneic one. This case was interesting in that a diagnosis of bundle branch block was made from the suggestive gallop rhythm and doubled apical impulse. The heart was markedly enlarged and electrocardiographic examination (Figure 3C) showed a well established right bundle branch block. The patient's general condition was rather poor and continued to become progressively worse up to his death which occurred on September, 29, 1929.

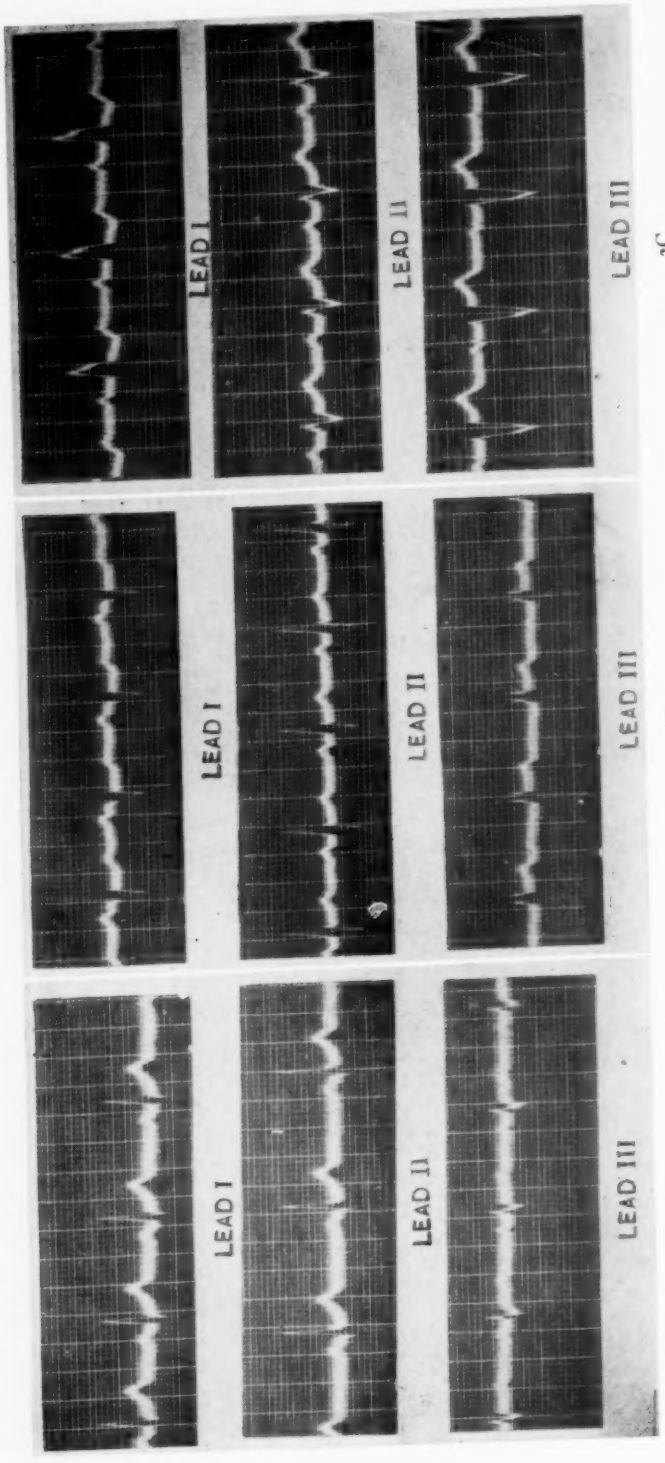
Comment

These three cases are presented in some detail in order to bring out several factors of interest. The close resemblance between the pain of herpes zoster and that experienced in certain types of angina pectoris is striking; all of the patients remarked upon the similarity in their own description of their symptoms. Two of them could hardly distinguish the difference. This observation is not entirely original, Mackenzie noted it in one of his cases.

In all three of our cases the coronary degenerative changes which took place following the herpes zoster attacks were rapidly progressive and ended fatally within five years. In each of these the herpes zoster occurred at a time when the hearts were apparently still normal and we have had an opportunity to watch the various changes that have occurred up to the time of their fatal termination.

No attempt can be made here to explain the relationship between the development of herpes zoster and the occurrence of angina pectoris in individuals who have subsequently succumbed to coronary arterial disease. The complex neurologic association of the factors involved in the production of herpes zoster appear to have a place in that multiphased clinical syndrome known as angina pectoris.

Whether the pain component of the herpes zoster syndrome and that of angina pectoris is the same, or whether they are two different entities using the same pathways for their transmission is a problem of nice distinction. Our series of cases is too limited to draw any far reaching conclusions but it may serve a purpose in focusing at-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tention upon the possible relationship between the etiologic background of herpes zoster and that of the neurogenic type of angina pectoris.

Summary

1. Three cases of herpes zoster which subsequently developed angina pectoris and died of coronary artery disease are presented.

2. The characteristic burning pain experienced in herpes zoster resembles in many respects that of angina pectoris. Patients may confuse the two.

3. Herpes zoster and angina pectoris exhibit identical zonal areas of altered skin sensitivity.

4. There is a possibility of a common etiologic background in both herpes zoster and angina pectoris of the neurogenic type.

Poliomyelitis Versus Landry's Paralysis.

An Attempt to Contrast Their Symptomatology and Pathology,

By Hermon C. Gordinier, A.M., M.D., F.A.C.P., *Troy, New York*

THERE is a remarkable difference of opinion among neurologists, internists and epidemiologists, with regard to the identity of Landry's paralysis: some contending that the acute ascending or rare descending type of paralysis originally described by Landry is simply a form of poliomyelitis, whereas others contend that Landry's paralysis is an independent symptom complex, not due to the specific virus of poliomyelitis, but due to some unknown form of toxin, bacterial, metabolic or chemic in nature, which seems to have a special affinity for the peripheral motor neurons. With this view, I am inclined to agree, having had the opportunity to observe clinically a large number of cases of poliomyelitis during the various epidemics which have occurred in this country, a few with autopsies, and have also had the rare opportunity of studying seven typical cases of the acute ascending paralysis of the type of Landry, in three of which I was able to make complete autopsies and study the entire nervous system of each.

I will, therefore, by means of photomicrographs attempt to contrast the neuropathology of the two diseases.

Poliomyelitis: Poliomyelitis is really a misnomer and equally so the name given to the disease by Heine, essential infantile paralysis, as the disease is not strictly limited to the motor neurons of the ventral gray columns of the spinal cord or is it by any means confined to infants or very young children; it affects older children and adults in from 10% to 15% of the cases. A definition more in accord with recent scientific investigations is the following: the so called infantile paralysis is a wide spread, acute infectious communicable disease of the nervous system, a meningo-myeloencephalitis, probably due to a specific, ultramicroscopic, filterable "globoid" body, discovered by Flexner and his co-workers, which has a special predilection for the cells of the ventral gray columns of the spinal cord, the bulbopontine cranial nerve nuclei, the cerebral and cerebellar cortex, and rarely the peripheral nerves. Wickman classifies the disease into the following types: the abortive common, spinal type, the bulbo-pontine and Landry's type, the cerebral type of Strümpell, the cerebellar type with acute cerebellar ataxia and the neuritic type.

A number of epidemics have occurred in this country, the first one of which accurately studied, was described

*Read at the Annual Meeting of the Rensselaer County Medical Society, November, 1928.

by Dr. Caverly of Rutland, Vermont, in 1894 and occurred in the Rutland Valley. He reported about 132 cases. During this epidemic, I saw two cases, both in adults, which because of the meningeal involvement, delirium and coma, I made a probable diagnosis of cerebro-spinal meningitis, until the residual paralysis and subsequent atrophy, made the diagnosis of the cases perfectly simple.

Subsequent epidemics occurred in 1907 and 1908 in New York, Vermont, Wisconsin, Pennsylvania, Minnesota, Michigan, Virginia and Nebraska. It is very probable that these epidemics may have been due to a large contingent of immigrant carriers from Scandinavian countries, where the disease existed during the early spring and summer.

The great epidemic of 1916 with which most of you are familiar seemed to have originated in Boston and greater New York, particularly in Brooklyn, and to have been carried along the lines of travel throughout Massachusetts and New York and the rest of the New England and Middle States, affecting about 30,000 people. Several small epidemic recurrences have occurred in various urban and suburban districts ever since, and sporadic cases are not at all rare.

I will not detain you with a detailed description of poliomyelitis but will describe its chief symptoms together with those of Landry's paralysis as observed in the seven cases of the latter disease which I have studied.

Landry's Paralysis: All of the seven cases of Landry's paralysis were in adults, varying in age from 28 to 50 years. The disease came on suddenly: first a rapidly ascending flaccid paralysis beginning in the lower extremities and rapidly involving in turn the muscles of the legs, thighs, pelvis, trunk, upper extremities, diaphragm, chest, neck, throat, head and cardio-respiratory centers, with death in five from cardio-respiratory paralysis. *In two cases, in which complete and permanent recovery occurred, the patients' symptoms were as described above and they both developed marked bulbar symptoms. In both of these cases complete physiological restitution of all the paralyzed muscles occurred without the slightest evidence of residual paralysis, muscular atrophy, reaction of degeneration, deformities or other evidences of trophic disturbances. In none of the cases were there any objective sensory disturbances found. In two cases, slight prodromata occurred, such as malaise, sore throat, pains and aches in the extremities and paresthesia. The mind was clear in each case until the last. There were no cranial nerve involvements except those of the bulbar nuclei. There was slight febrile reaction in two cases at the onset, in the others, none existed until just a day or two prior to death. The organic reflexes were controlled, the deep reflexes as well as the superficial reflexes were absent. The spleen was just palpable in two cases, no lymph nodes were palpable in any case.

The picture presented by a typical case of Landry's paralysis is very striking. The patient assumes an extreme dorsal decubitus, is unable to sit up, turn to one or the other side or to

*Albany Med. Annals, January, 1904.

FIG. 1—*Poliomyelitis.* Section of lumbar cord showing right ventral horn near base, with interstitial and perivascular infiltration. Note the paucity of ganglion cells due to edema, and cuff of round cells surrounding vascular walls. Low power.

rotate, extend or flex the head. The complete flaccid paralysis of all four extremities, great difficulty in swallowing and articulation, marked dyspnea from involvement of the respiratory and cardiac centers, retention of perfect consciousness to the last with facies of extreme anxiety and apprehension, completes the sad picture of this dreaded disease.

Poliomyelitis: The paralytic manifestations of poliomyelitis are often preceded by prodomata such as sore-throat, coryza, a slight, moderate or high febrile rise, rapid pulse, diarrhoea, vomiting, rarely convulsions, severe headache, neuralgic or rheumatoid pains, profuse sweating, soreness of the muscles of the neck, back or extremities, hyperesthesia, severe abdominal pains; two cases seen in consultation were at first diagnosed as appendicitis until the sudden onset of paralysis made clear the diagnosis. Vertigo, apathy, drowsiness often approaching coma, tremor of extremities, paresthesia, stiffness of the neck on bending forward and occasionally definite Kernig sign. In the abortive type of poliomyelitis, the prodomata may be the only symptoms present or they may be associated with pallor, slight temporary weakness, together with slight diminution or loss of the deep reflexes of one or more of the extremities. The type and character of the motor symptoms are entirely dependent on the longitudinal extent and exact situation of the pathologic lesion. The paralysis usually comes on rapidly following the prodomata, and there may be complete or partial paralysis of a limb, or two or more limbs, with loss of the deep reflexes. Occasionally, if the lesion is very limited, a single group of muscles may be involved, such as the erector spinae, abdominal muscles or those of the throat, face or those innervated by the ocular nerves, upper or lower arm or peroneal group, or rarely only a single muscle may be affected, so localized may be the inflammatory process. I have twice seen just the deltoid muscle involved, and once the quadriceps extensor femoris. The paralysis is usually of the flaccid type and it is followed in a week or two by definite muscular atrophy with the electrical reaction of degeneration; vasomotor and trophic symptoms are quite common such as pallor, localized sweating, lividity and coldness of the skin of the affected parts, marked muscular atrophy, and in children the growth of the bones of the extremities is often retarded and changes in the size of the lumen of the blood vessels not infrequently occur. The reflexes in the preparalytic stage may be exaggerated, diminished or absent on one or both sides, depending on the extent and exact location of the lesion. In the rare cerebro-cortical or upper motor neuron type described by Strümpell, the paralysis is of the spastic type, hemiplegic in distribution, the deep reflexes are exaggerated and certain pathologic reflexes are present such as the Babinski, Oppenheim, Gordon and Shattuck reflexes as well as ankle and knee clonus on the paralyzed side. The paralyzed muscles are stiff and rigid. Subjective sensory manifestations are rather common, objective sensory findings other than muscle or nerve tenderness and slight neck stiffness, are rare. Examination of the spinal fluid should be carried out in every

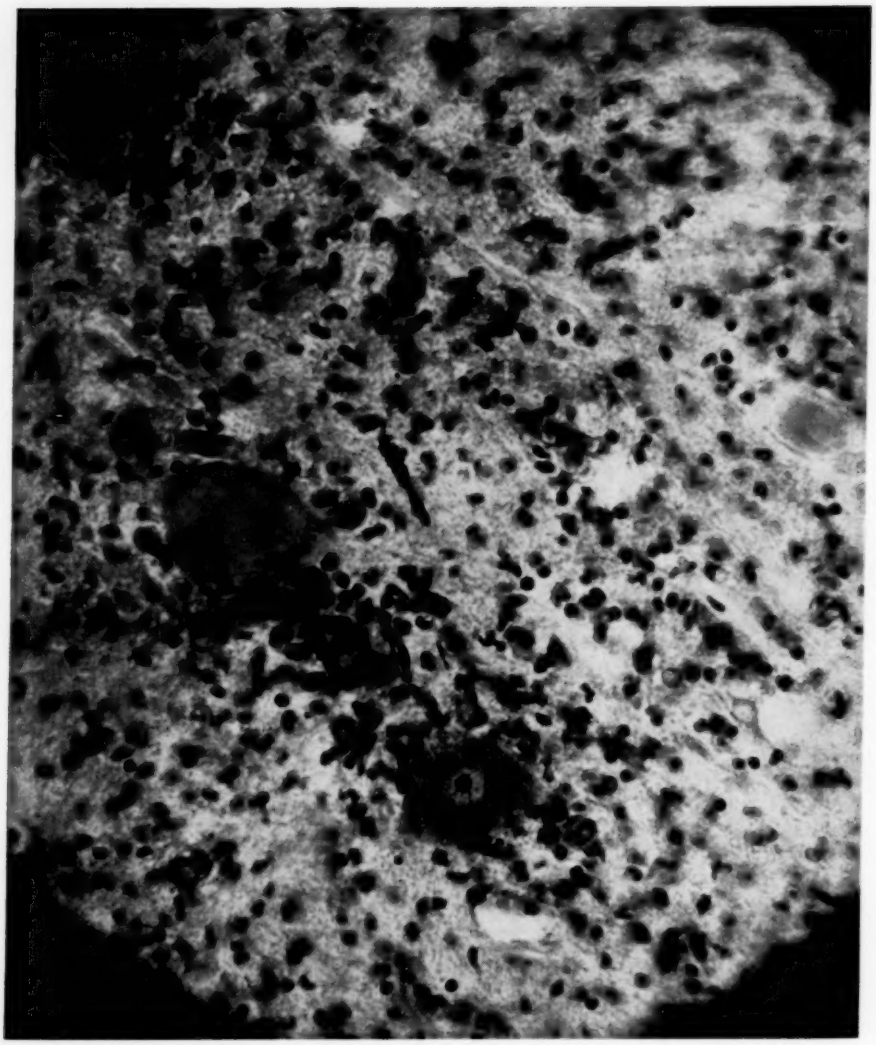

FIG. 2.—*Poliomyelitis.* Section through right ventral horn of lumbar cord showing interstitial round cell infiltration, polyblasts and degenerated ganglion cells. High power.

suspicious case, not only because of the help it may lend in the early diagnosis of the preparalytic or abortive type of case, but also as a guide to the early introduction of immune serum.

In order to make clear the neuropathology of poliomyelitis and Landry's paralysis, I will contrast the changes found in the nervous system in a case of each disease.*

CASE I.

A case of acu'e poliomyelitis of the Landry type in a young adult, involving almost simultaneously the muscles of both upper extremities, trunk, diaphragm and those of the left lower extremity. Death at the end of five days from respiratory paralysis.

The post mortem examination was confined to the central nervous system. The dura was normal; sinuses free. The pia arachnoid showed increased vascularity. No exudate observed. There was an increase of the cerebro-spinal fluid. Otherwise, the brain appeared normal.

Spinal Cord. The membranes of the spinal cord were deeply injected and there was an increase of cerebro-spinal fluid. The spinal cord on section showed in the region of the central gray matter, remarkable increased vascularity, which gave that region a deep purple or velvety appearance, thus making the letter "H" stand out clearly in sharp contrast to the surrounding white matter.

MICROSCOPIC EXAMINATION.

Spinal Cord. The most obvious change is a remarkable perivascular and interstitial round cell infiltration universally distributed throughout the spinal cord, being most marked in the cervical and lumbar regions. While this infiltration is particularly striking in the ventral gray columns, it is not confined to these regions as it exists to a lesser degree in the posterior gray columns and surrounding white matter. The pia mater, especially that portion covering the ventral surfaces of the cord and medulla, shows both a diffuse and vascular mononuclear round cell infiltration. Many of the centripetally coursing vessels, supported by the delicate sub-pial neuroglia septa, show marked perivascular infiltration. The dura is normal throughout. The central canal seems enlarged and contains a number of small round cells. The motor cells of the ventral gray columns especially those of the cervical and lumbar segments, are greatly reduced in numbers, which is explainable by the accompanying inflammatory edema. They all show various degrees of degeneration, from slightly early chromatolysis to absolute destruction, and many cells are the seat of an active neurophagocytic process. The blood vessels, especially of the central gray matter, are dilated and full of blood corpuscles. No thrombi or capillary hemorrhages found. The round cell infiltration is chiefly of the lymphocytic type, with small deeply stained nuclei, with nongranular protoplasm; diffusely scattered through the gray matter are a number of larger cells with granular protoplasm, they may be polyblasts or glia cells. The ventral or dorsal nerve roots show no definite change.

The Weigert stain shows no degeneration of the fibres of the white columns of the cord. Considerable separation of the fibres existed, however, as if from the compression of edema. Similar changes, although not as pronounced, existed in the medulla and pons, especially in the region of the cranial nerve nuclei and pia.

The cerebellum appeared normal. The para-central lobules show both a diffuse and vascular, round cell infiltration. The large pyramidal cells of the motor cortex show no pronounced alterations.

CASE II.

A case of rapidly ascending motor paralysis of the type of Landry, which began suddenly in the muscles of the lower extremities, extended rapidly upward, involving in turn those of the thigh, pelvis, trunk, spine,

*These cases were reported in full together with bibliography to date in a paper before the Amer. Neur. Ass., May 1914.

FIG. 3.—*Landry's Paralysis.* Section through lumbar cord showing blood vessel in right ventral horn without round cell infiltration.

upper extremities and diaphragm, and without subjective or objective sensory disturbances, the mind being clear to the last. Death from respiratory paralysis eight days from the onset.

PATHOLOGY OF LANDRY'S PARALYSIS.

Brain. The skull and scalp show no change. The dura is free and is otherwise negative. No thrombi exist in the sinuses and no general congestion is present. The pia arachnoid seems perfectly normal, as does the whole cerebral cortex and base. The blood vessels of the brain show no changes. The brain stem, pons, medulla, cerebellum and spinal cord appear negative, macroscopically. The spinal cord, pons and medulla, show no macroscopic changes on section. Cultures taken from the cerebrospinal fluid, heart's blood, brain, spinal cord, spleen and liver show no growth.

Sections were made from various levels of the spinal cord, medulla and motor cortex and stained with hematoxylin and eosin, neutral red, Nissl's, van Gieson's and the Weigert Pal methods. The membranes of the cord and brain were normal. The small blood vessels of the ventral horns and intermediate gray matter were unusually prominent; many were dilated and contained thrombi. There was no definite perivascular or pericellular mononuclear infiltration. The vessel walls appeared normal. Very slight round celled infiltration existed throughout the central gray matter and about the slightly dilated central canal, there was a great paucity of cells about the blood vessels. Scattered throughout the central gray columns of the entire spinal cord, but especially prominent in sections through the lumbar and cervical segments were multiple small capillary hemorrhages. The ventral column cells at all levels, but especially those of the lumbar and cervical regions showed distinct degenerative changes. Many of the cells appeared swollen, irregularly shaped with their chromatin network deeply stained or very granular and pale. Some cells showed marked central chromatolysis with the peripheral granules intact, whereas others showed both central and peripheral chromatolysis with displaced nuclei, whose nuclear envelopes were wavy or irregular in outline and some showed distinct fragmentation. A few cells devoid of their nuclei and their Nissl bodies were degenerated into a fine dust. The normal pigmentary substance or lipoid of the cells was greatly in excess. Many shadow cells existed with absent nuclei and with only a few scattered degenerated tigroid bodies. Some of these cells contained leucocytic inclusions and rested in dilated pericellular spaces, while the dendrites were for the most part preserved. Some cells were devoid of them, and there was in many of them a paucity of the Nissl bodies. Very slight chromatolytic changes existed in a few of the cells of Clark's column. They were, otherwise, normal as were the cells of the posterior gray columns and those of the posterior spinal ganglia. The ventral nerve roots showed slight degenerative changes doubtless secondary to the changes in the cells of the ventral cornua. The posterior nerve roots were normal. The intracornual nerve network appeared normal. Sections through the motor cortex, cerebellum, pons and medulla showed no definite changes. The peripheral nerves were normal. No degenerative changes were discovered in the white columns in sections stained after the method of Weigert-Pal.

Summary

Briefly the pathological changes in poliomyelitis are those of a round cell infiltration of the leptomeninges, spinal cord, brain and cerebellum, remarkable peri-vascular round cell infiltration of the blood vessels of the spinal cord and oblongata, particularly those distributed in the ventral gray columns, central gray and adjoining white matter, and much less marked about the vessels of the leptomeninges of the brain, gray and white matter, and least so of the cerebellum. Marked edema, especially in the gray matter of the cord and medulla with distinct

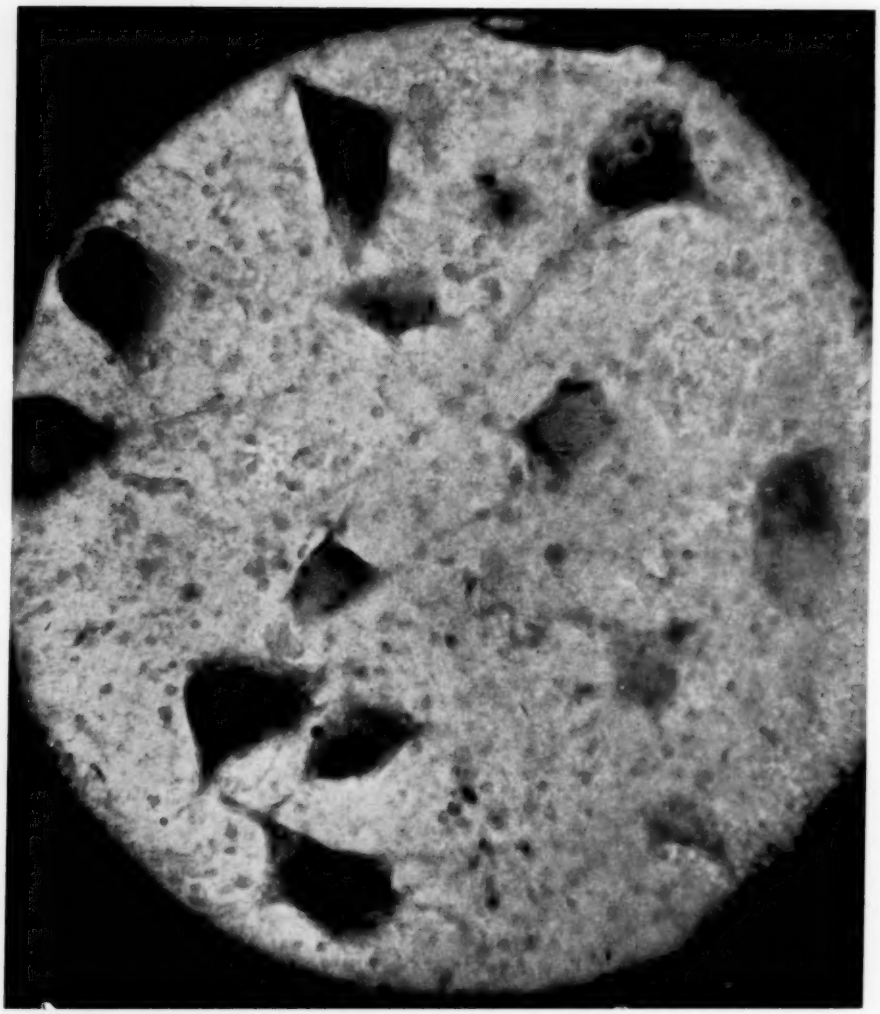

FIG. 4.—*Landry's Paralysis.* A group of ventral cornual cells from a section through the mid-cervical region, showing all stages of chromatolysis.

nutritional changes or absolute destruction of many of the motor cells therein contained. Both pericellular and perineural round cell infiltrations are quite marked. In other words, the process seems to be a very acute rapidly progressive inflammatory reaction manifested by lymphocytic infiltration of the perivascular, pericellular and perineural lymph spaces, due to the specific virus of the disease.

*The pathologic changes in Landry's paralysis, on the other hand show but slight or no round celled infiltration, no definite pericellular, perineural or perivascular infiltration. If one compares side by side sections of various levels of the spinal cord of poliomyelitis and Landry's paralysis, one is struck by the paucity of round celled infiltration in the latter disease.

*The very active virus or toxin produces degenerative changes involving the whole peripheral motor neurons with especial predilection for their cells of origin in the ventral gray columns of the spinal cord, and motor cranial nerve nuclei of the oblongata. These changes result in chromatolysis, displacement of the nuclei, neuronophagia, many shadow cells, or the complete destruction or effacement of the cells. Small hemorrhages are not at all uncommon, many thrombosed vessels are to be found. The peripheral nerves in many cases also show definite changes. The process seems to be a rapid degenerative type, rather than inflammatory in character.

*Pathology of the Nervous System by Buzzard and Greenfield, page 211.

Conclusions

1. I wish to lay especial emphasis on the absence in this case and two others studied, together with many of the recorded cases of the Landry symptom complex in the literature, of mononuclear round cell infiltration of the pia, vascular walls and gray matter, which is so characteristic pathologically of poliomyelitis.

2. These cases cannot be relegated either on clinical or pathologic evidence to the adult type of poliomyelitis or multiple neuritis.

3. The symptom complex known as Landry's Paralysis seems to be due to some as yet unknown infectious process which has a special predilection for the peripheral motor neurons.

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Agranulocytosis: Report of Five Cases with Two Recoveries.

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During the past few years a considerable literature has accumulated dealing with agranulocytic angina or agranulocytosis. This consists of case reports, autopsy studies and discussions as to the nature of the condition. Several explanations have been offered, no one of which is entirely satisfactory. That it is a clinical entity as thought by Schultz[1] and others is seriously questioned, many observers taking the view that it represents merely an unusual response of the leucocytes to infection as was held by Turk,[2] who described an identical picture under the title of "Septic diseases with destruction of granulocytes."

Of the cases reported, the constant and characteristic feature is the blood picture. There is a striking leucopenia, the total count going as low as 100 cells per cubic millimeter, of which less than 10% are polymorphonuclear cells and more than 90% lymphocytes. The red cells and hemoglobin show little or no variation from normal, the platelets are normal. In most cases ulcerative or necrotic lesions have been observed in the mouth or throat and occasionally elsewhere on mucus or cutaneous surfaces. In many instances these have appeared after the disease was well under way. High fever of a continuous type, chills and prostration are the rule, while in about half the cases jaundice has been noted. The onset is usually abrupt and the disease progresses to a fatal termination in one or two weeks, most of the patients developing broncho-pneumonia. Recovery has been rare. Autopsy studies have disclosed no characteristic findings either in the bone marrow or other tissues.

Of five cases with agranulocytic leucopenia observed by the writer, three died and two recovered. The three fatal cases conform in most respects to the now well-known picture of agranulocytic angina and are described briefly. The two that recovered are reported in more detail, inasmuch as recovery from this condition is comparatively rare and several features in the course of the disease are of interest in connection with the general question of agranulocytosis.

Case Reports

Case 1: Married woman, 52 years of age, seen at the Memorial Hospital in consultation with Dr. C. C. Coleman. Her past history was entirely negative. Four days previously she had become suddenly ill with fever, chills and sore throat and had grown rapidly worse. An indurated swelling had appeared on the right side of the neck, incision of which showed only bloody serum.

Examination showed extensive ulceration

of the throat and soft palate which were more or less covered with a dirty white membrane; while in the lungs were signs of broncho-pneumonia. Smear and culture from throat were negative for Klebs Loeffler bacilli, and blood cultures were negative. Leucocyte count was 600 cells per cu. m.; no polys seen. Death two days later. No autopsy.

Case II: Single woman, age 40, seen with Drs. Anderson and Royster at Westbrook Sanitarium, where she had been under treatment for three months as a mental patient. Her illness had begun five days previously with a sore throat and high fever. At first the throat was diffusely red with one small whitish spot on the tonsil. Later there was ulceration and swelling that ruptured with the discharge of bloody pus.

Examination showed temperature 104, pulse 150, and signs of consolidation in the left lung base. The average of seven leucocyte counts was 250 cells per cu.m.; no polys were found. Smears from the throat showed a long and short chained streptococcus. Blood culture was negative. The patient died the following night. No autopsy.

Case III: A farmer of 47 was seen at the office, having been referred by Dr. Ferry of Miller's Tavern, Va. He complained of weakness, which came on with an attack of sore throat and grip six weeks previously, and pain in the rectum of two weeks duration. During the attack of grip he was said to be jaundiced. There had been slight diarrhoea but no bleeding.

Physical examination was negative except for extreme pallor with a yellowish tinge, a spleen that extended several inches below the costal border and an ulcer just inside the anus. The blood count revealed a hemoglobin of 39%, red cells 2,160,000, one normoblast seen, leucocytes 1,600, pmn 16%, lymphs 84%. No cord changes were made out, the gastric contents after a test meal contained free HCL and there was no fever. He went to his home, promising to return for further study. Four days later he was admitted to the Johnston-Willis hospital complaining of pain in the left chest and fever which followed a chill. Examination showed temperature 103, signs of diffuse broncho-pneumonia and some extension of the rectal ulceration. On admission the leucocytes were 1,100 with pmn 14% and lymphs 86%. The patient grew steadily worse and died a week later. The white cells diminished and on the day before death were 200 with 12% pmn and 88% lymphs.

Autopsy showed extensive bilateral broncho-pneumonia. The note on the spleen by Dr. W. A. Shepherd was as follows:

"Spleen measures 15x20 c.m. Section shows marked pigmentation and rarefaction of adenoid cells so that the splenic reticulum is visible, in considerable areas, free from cells. Splenic nodules are imperfectly preserved, showing a pronounced narrowing of the areas of condensation around the arterioles. Endothelioid cells are occasionally encountered. In the rarefied areas many distorted cells are seen."

Case IV: A married woman of 66 was seen at her home in Petersburg, Va., with Dr. J. D. Osborne, her family physician. She had been troubled for two months with pains over the entire body, chiefly in the muscles, and a diseased tooth had been extracted. The gums healed and at no time was there sore mouth or sore throat. For four days she had had fever which began abruptly, going as high as 104, and this was accompanied by diarrhea, little or no abdominal pain, no blood, slight nausea and occasional vomiting.

The temperature was 103.2, pulse 120, respiration 34. The throat was somewhat red but no ulceration or exudation seen. Over the lower left back a few moist râles appeared but there was no accompanying change in the breath sounds or percussion note. Blood examinations: Hb 68%, rbc 3,200,000, wbc 600, pmn 4%, lymphs 96%. Little hope was held out for recovery, but, on the day following, the temperature suddenly dropped, the patient appeared much better and there was a prompt rise in the leucocyte count with a steady return to normal. Dr. Osborne kindly furnished me

with his observations on the course of the fever and blood changes and these are shown in Fig. 1.

Case V. A physician of 48 had been examined from time to time over a period of 8 years. He had a slight hypertrophic arthritis, a few apical abscesses for which extraction was done, and several mild attacks of appendicitis with appendectomy and the removal of an appendix described as subacute. Numerous blood examinations had shown nothing abnormal. On March 27, 1929, he was admitted to the Johnston Willis Hospital acutely ill. He stated that ten days previously he had a rather acute pain in the upper abdomen relieved by vomiting. Though not feeling well, he continued to work until two days before admission when the pain again became severe and was accompanied by nausea and vomiting, a temperature of 102 and slight jaundice. The following day his temperature was 104, pain and vomiting continued and some surgical lesion in the abdomen was suspected. For 24 hours the throat had been extremely sore.

The temperature on admission was 103, pulse 90. The throat was deep red, but no ulceration seen, the cervical glands somewhat enlarged and quite tender. The abdomen was distended and generally tender but not definitely rigid. Blood examination showed Hb 75%, rbs 3,820,000, wbs 2,100, pmn 1%, lymphs 99%, platelets 290,000. Cultures of blood and stools were negative. Cultures from throat showed streptococcus. For several days no improvement was noted, pain in throat and abdomen continued with nausea and occasional vomiting, and on March 30th, the leucocytes were 1,100 with polys 3%, lymphs 97%. At this time X-ray treatment was arranged to be done the following morning, but during the night the temperature fell and, as the leucocytes showed an immediate rise, no treatment was given. Improvement thereafter was rapid, the course of the temperature and leucocyte count being shown in Fig. 2. Subsequent blood counts were of interest, though the patient was free from pain and fever and rapidly gaining strength. There was a steady rise in the total count with an increase in both granular cells and lymphocytes. On April 4th. there were 16,400 leucocytes with polys 53% and lymphs 47%. Following this there was a decline which was gradual and on April 30th a count of 2,850, polys 48%, lymphs 52%, was recorded. A second gradual rise then began and on June 10th. the total leucocyte count was 7,800, polys 58%, small lymphocytes 37%, large lymphocytes 3%, eosinophiles 2%, Hb 89%, rbc 4,320,000.*

Comment

If the diagnostic criteria laid down by Schultz were strictly adhered to, only two of the cases here presented could properly be included under the term agranulocytic angina for the reason that no necrotic or ulcerative throat lesions were demonstrable and two cases recovered. There is no agreement, however, among writers on the subject that the throat lesions are an essential part of the picture or that they bear any etiologic relation to the fever and blood reaction. The fact

**Subsequent Note on Case V.* Except for slight nervousness and occasional insomnia he was free from symptoms and blood was normal up to June 24th. On this date he became ill rather suddenly with sore throat, general aching and fever. He was admitted to the hospital and, when seen about 12 hours after the onset, the throat was red, the cervical glands enlarged and tender and there were several elevated, dusky red, tender nodules about 1 cm in diameter over each cheek and a similar nodule on the buttock. Leucocytes 1500. Small lymphocytes 100%. Fever was high and continuous, a grayish membrane appeared on the fauces, followed by extensive ulceration. Daily count of leucocytes showed only small lymphocytes, the total number going as low as 200. X-ray treatment was given without apparent effect. Death occurred July 2, 1929.

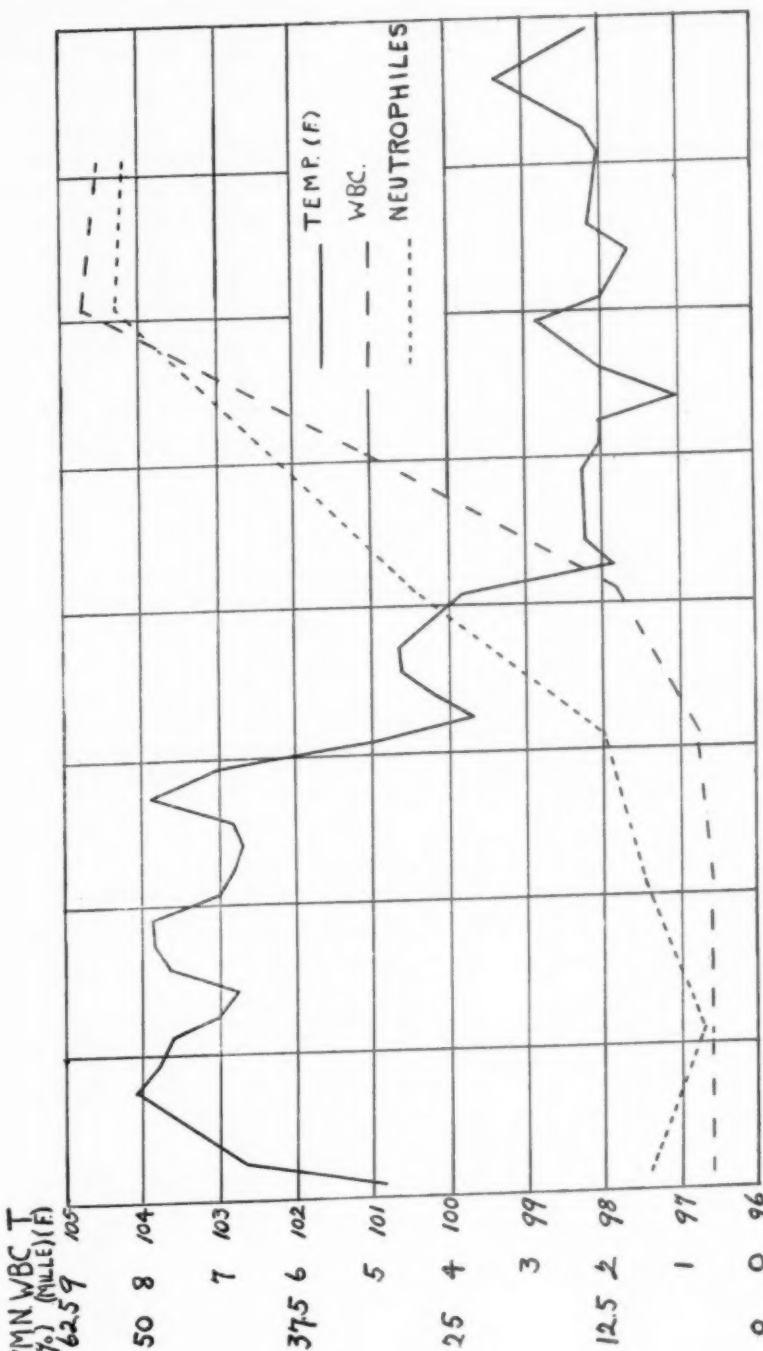

FIG. 1. Coincidental rise in total and neutrophile count following fall of temperature in Case IV.

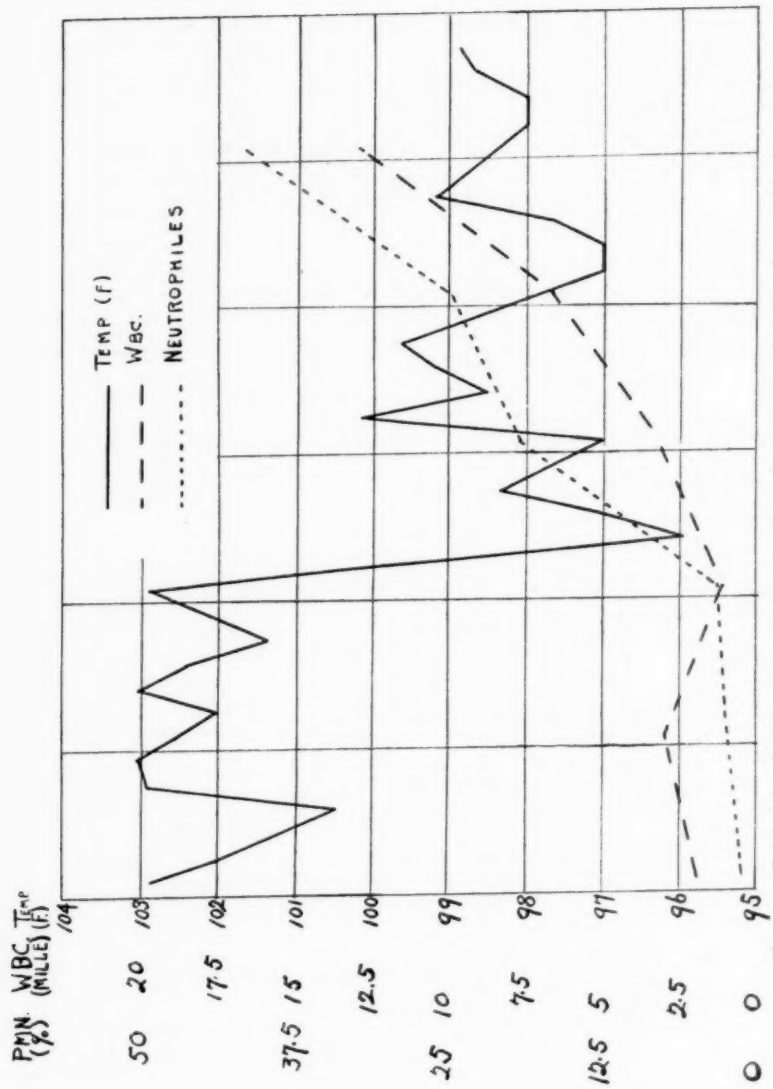

FIG. 2. Crisis-like fall in temperature in Case V accompanied by sharp rise in total leucocytes and neutrophiles.

that they often appear after fever and blood changes are well established would indicate that they are secondary, and this view is held by a number of observers. In Case III enlarged spleen, secondary anemia, agranulocytic leucopenia and rectal ulceration were observed before the onset of fever. There was a history of an acute illness with fever and jaundice six weeks previously, but no blood examination was made at this time. It seems likely that temporary improvement had taken place with relapse later and death.

In Case V of this series there was rather severe sore throat beginning several days after the onset of illness and, though no ulceration was seen, it is readily conceivable that ulceration and necrosis might have appeared, had recovery been postponed a few days longer.

Of forty-three cases collected by Kastlin,[3] only three recovered, and Hueper[4] in a later review of the literature could find only six. One is impressed in reading the case reports available with the energetic treatment employed, especially blood transfusion. In view of the comparatively normal red cells and hemoglobin, transfusion seems hardly indicated and experience with it so far recorded indicates that at least it does no good. X-ray, given in small doses to the long bones, has received some attention and in a few cases has seemed helpful. In Case V, X-ray treatment was decided on in the evening and, had it been given at once, instead of delaying until the next morning, an apparently excellent result would undoubtedly have appeared.

The most striking feature of the two cases that recovered is the prompt rise in leucocytes, chiefly in granular cells, which occurred with the crisis-like fall in temperature.

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Newer Methods in Tuberculosis Therapy*†

By Benjamin Goldberg, M.D., *Chicago, Illinois*

At the International Congress on Tuberculosis in Washington in 1908, in greeting the delegates, Dr. Edward Livingston Trudeau, said: "For thirty-five years I have lived in the midst of a perpetual epidemic, struggling with tuberculosis, both within and without the walls, and no one can appreciate better than I do the great meaning of such a meeting. I have lived through many of the long and dark years of ignorance, hopelessness, and apathy, when tuberculosis levied its pitiless toll on human life unheeded and unhindered; when, as Jaccoud has tersely put it, 'The treatment of tuberculosis was but a meditation on death.' But," Trudeau continued, "I have also lived to see the dawn of the new knowledge."

Trudeau was, indeed, present at the dawn; it is unfortunate that this great pioneer died before he had opportunity to witness the further realization of that dawn. If Trudeau lived today, the measure of his gratification would be more complete. He would sense in the present day tendency of our tuberculosis program, a stronger tone of optimism; he would feel, we think, that his dream was well on the road to fulfillment, that present tendencies and present measures of prevention and therapy were, at length, to master tuberculosis.

In the decade and a half since Trudeau died, many features have been added to the tuberculosis program which tend to accelerate the progress and intensify the activities of the anti-tuberculosis campaign. The broad foundations laid by Trudeau and other early workers have been sufficiently strong and stable to support the superstructure of the more recent scientific contributions. These later contributions, unfortunately, are not given the widespread attention that this major disease, which interests us, demands.

Prevention: We will first consider prevention. Both from the point of view of its chronological sequence and from the point of view of its importance, the subject of prevention demands first place in our consideration.

Immunization

The subject of artificial immunization of the human host is today receiving special attention. Calmette, of Pasteur Institute, and his co-workers have focused our attention on a method of immunity developed by them. According to the Calmette method, an

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†Read at the Annual Mississippi Valley Conference on Tuberculosis, Grand Rapids, Michigan, on September 20, 1929.

attenuated culture of bovine tubercle bacilli, attenuated through repeated growth on bile potato media, is used for inoculation.

The Bacillus Calmette Guerin (B. C.G.) is administered orally during the first ten days of life, the approximate period, according to von Behring, during which the intestinal mucosa is permeable to the bacillus tuberculosis. Calmette claims for the culture of bacilli, chosen and grown according to his formula, that it is absolutely avirulent and produces an immunity to tuberculosis within a period of approximately four weeks. This immunity, it is claimed, is sufficient to protect the child against even the intimate contact represented by exposure of an infant to a mother suffering with open tuberculosis.

The Bacillus Calmette Guerin has been in use, experimentally, for a period of years, and to date, perhaps, more than two hundred thousand infants have received protective inoculation. Unfortunately, the statistics compiled concerning the tuberculosis morbidity and mortality among inoculated children are not above criticism. Sufficiently exhaustive investigation of the individual case has apparently not been carried out, and routine post mortem examination has not excluded tuberculosis. This fact, combined with the observation that other workers in attempting animal passage with the Bacillus Calmette Guerin organism, have, in certain instances seen death occur. Death, accompanied by asthenic emaciation and enteritis has occurred in the guinea pig, and in other instances, post mortem has revealed a definite tuberculosis.

The question of allergy in connection with artificial immunization is of interest, but rests for the present on debatable ground. Certain questions are still unanswered. Does such allergy, as is indicated by the presence of a positive tuberculin reaction, constitute an immunity? Is the absence of a positive tuberculin reaction indicative of lack of immunity? Is it possible, as Calmette claims, that in certain instances immunity may be present in the absence of a positive tuberculin reaction?

We cannot answer these questions today with any approach to scientific finality. I feel, however, that we should not be too hasty to condemn; if immunity to tuberculosis can be produced by this method, or a similar method, the entire tuberculosis problem is on the verge of solution.

We have done some work along the lines of inoculation in the Municipal Tuberculosis Sanitarium. After a year or more, however, of animal experimentation in our laboratories, it was deemed not advisable to attempt human inoculation. As the matter was still debatable, it was considered better to defer human immunization until such time as the results of years of work abroad should prove conclusive.

Contact Exposure: If we consider tuberculosis from the viewpoint of hygiene alone, we are confronted by the problem of a germ-borne or infectious disease, which is practically ubiquitous. The disease is preventable; we know it is preventable. If we can prevent infection from entering the body of its human host, it goes without saying that no pathologic process and no disease can result. The difficulty, of

course, in the way of prevention, is that, as stated, in city life at least, the bacillus is practically ubiquitous. The infection is so far reaching and the manner of infection so varied, that sooner or later a majority of city dwellers develop a positive tuberculin reaction.

We now come to the difference between infection and disease. Although the organism, as stated, is practically ubiquitous, and although infection in city dwellers is the rule rather than the exception, the proportion of the general population that succumbs to tuberculosis is relatively small.

Why is it that infection is not more frequently followed by disease? What is the pathogenesis of tuberculosis in the adult human host? Does the disease result as an endogenous reinfection from the primary focus, or, on the other hand, does active disease supervene as an expression of exogenous superinfection? What is the relation of resistance to infection? In what way is resistance in its turn bound up with such considerations as the amount or degree of infection, the time of life in which infection occurs, race history, etc.?

These and other questions are as yet not solved, nor do they appear easy of solution.

We do know, however, from clinical observation and statistical compilation, that the matter of contact, particularly intimate contact with active, open tuberculosis, is one of the most important and most constant etiologic factors in the production of the disease.

In Chicago, we consider the study and control of the contact as of first importance. In addition to segregating the children under sixteen years of age from the open case, we have established a new system of contact control. A special chart of distinctive green color, containing special "contact sheets" is used for the individual adult or child who has lived in the same premises with a case of known tuberculosis. The distinctive color of the chart makes it readily recognizable in the files, and renders the compilation of contact statistics much easier.

The system of contact study applies not alone to children. Realizing the importance of contact even in adult life, and realizing, furthermore, the possibility of superinfection, our system of contact study was extended to include observation of *all* contacts, adults as well as children. Every individual, adult or child, who has been exposed to open tuberculosis, is kept under constant surveillance and is reexamined at definite intervals. Advice regarding habits, diet, general health building and disease prevention, is given as part of the program. Close supervision and frequent examination of contacts permit of early diagnosis, and this, of course, is an essential objective in an anti-tubercluosis campaign.

In the two year period, 1927 and 1928, 9,891 new contacts were examined, and 645 cases of tuberculosis uncovered. Of the 645 cases, 545 were cases of pulmonary tuberculosis; 93 were gland tuberculosis, and 7 bone and other forms of tuberculosis.

Control of the Open Case. The control of the open case is the prime consideration in our present day program of prevention. The civilized

world, both lay and professional, is being aroused to the necessity of segregation. Prevention of infection, particularly in childhood, is essential and without adequate control of the positive sputum case this objective is unattainable. I may perhaps define the situation better if, for a moment, I draw your attention to the situation in Chicago.

In Chicago at the close of 1928, there were 3,167 positive sputum cases under supervision. Of these only 25 were in contact with children, and these 25 were in process of clearance. During the year there were 942 cases in contact. Contact was broken in 917 cases and 1,927 children thus protected from further infection.

The separation of the child contact from the open case of tuberculosis is made possible through a paragraph in the State Rules and Regulations for the Control of Tuberculosis, which reads: "No child under the age of sixteen shall live in the same home, apartment or other place of abode or habitation with any person suffering from active tuberculosis (consumption)." This law is rigidly enforced, irrespective of the social or economic status of the individual, and its enforcement, we are convinced, constitutes the most important phase of our preventive work.

Chest Surgery. Until recently there was little hope for the advanced, progressive case in which pneumothorax and routine treatment had met with an unfavorable response. The physician, however, schools himself against despair. He is imbued with the underlying significance of Mme. Swetchine's saying, "God has prohibited despair." Ingenuity, optimism and courage have opened up a new avenue of hope for the condemned—the advanced consumptive. Surgery has come to the aid of the phthisiotherapist, who formerly had relied principally upon the time honored triad—rest, fresh air and food.

There are, it is estimated, in this country, approximately a minimum of 500,000 to a maximum of 1,000,000 active cases of pulmonary tuberculosis. Statistics compiled from the larger urban centers indicate that over fifty per cent of individuals with tuberculosis, when they first appear for treatment, are already in an advanced stage of the disease. This is regrettable and constitutes a serious problem; the more advanced the disease process, the less likelihood of recovery. Some of these patients, already beyond the favorable phase of incipiency, had in the past, before the advent of chest surgery, only the benefit of artificial pneumothorax. The limitations of pneumothorax, however, are very great and its scope of usefulness comparatively very narrow. Many, or perhaps even the majority of the advanced cases, were either entirely unfit for pneumothorax therapy or were only partially benefited by the procedure.

It was to this group of patients, to patients who could not receive benefit from routine treatment or from pneumothorax, that chest surgery came as a new and unhoped for measure of salvation. It is estimated that there are about 40,000 such individuals in this country, individuals from whom, according to the old routine, the prognosis was very grave, but for whom,

owing to the introduction of thoracoplasty, hope is kindled anew.

In recent months, as our knowledge concerning the value of the surgical procedures has become more clearly defined, it has become evident that the field of chest surgery holds much greater possibilities than was at first supposed. It is not only to the far advanced, hopeless individual that chest surgery offers a measure of hope. In the early case, also, as is becoming more apparent each day, chest surgery has a pronounced sphere of usefulness. A simple surgical procedure, applied without pain or danger, may result in more improvement to the early case than weeks or even months of sanatorium stay.

One such procedure—the crushing or removal of the phrenic nerve, we mention briefly. The chief value of this procedure lies in the fact that it produces an almost absolute relaxation of the lung on the side operated upon. This relaxation of the lung allows a practically complete pulmonary rest and has the additional benefit of compression from the relaxed elevated diaphragm.

The phrenic nerve is easily exposed, injected, crushed or removed with a technic which must be carefully carried out, but which may be easily learned. If one merely visualizes the immobilization of the lung achieved by this method, one can readily understand why the healing of an early tuberculous process may be promoted under this plan better and more rapidly than through the method of any procedure formerly used. Our experience indicates that it will supplant pneumothorax in about 80 per cent of cases where previously the latter had been indicated.

The other surgical procedures are extrapleural pneumolysis and thoracoplasty. In the few years it has been our privilege to utilize them, we have learned that these operations are specific procedures, each one with its own indications and contra-indications, its limitations and its possibilities.

There are three guiding principles which are absolutely essential to the success of chest surgery. In the first place, it is necessary that the surgeon have the requisite skill and experience for this type of work. In the second place, it is essential that the cases chosen for operation be suitable. In the third place, it is necessary that the institution which does chest surgery possess all the equipment of a well-ordered, general hospital, and be in position to give the same pre- and post-operative care as is characteristic of such a hospital.

It may not be amiss to mention in passing, that apart from chest surgery the sanatorium based on the general hospital plan, is in a position to give efficient and timely treatment to the surgical complications of tuberculosis. A tuberculous patient suffering with a non-tuberculous complication, as Graves' disease, is struggling along under double handicap. In the case of Graves' disease, for instance, the removal of the sources of toxemia by means of operation will greatly aid the patient in his battle against tuberculosis.

Diet. Studies and chemical research inaugurated within the last few years, are opening up a new vista to general medicine, and in particular to phthisiotherapy. We are beginning to realize

that body chemistry can best be influenced through the medium of food. The importance of the mineral balance, both in health and in disease, and the relation between this mineral balance and the dietary, has not, in the past, been sufficiently appreciated. An adequate mineral supply is especially indicated in tuberculosis. Available evidence seems to show that the loss of mineral salts is higher in tuberculous patients than in the normal individual. The output of chloride is generally increased.

From Germany there comes to us statements concerning new dietetic principles which, according to those making the experiments, seem to be unusually efficacious in aiding the recovery of tuberculous individuals. Gerson and Sauerbruch stress the importance of the mineral balance and emphasize the advantage of salt restriction. The salt restriction is advised even in the face of an increased chloride output, because it is claimed that salt increases cell metabolism which of itself tends to be excessive in tuberculosis.

In the Gerson diet such articles of food as common salt, smoked and pickled meats, ham, sausage, conserves, smoked or salted fish, bouillon cubes and vinegar are prohibited. Fresh meat, internal organs such as brain, liver and kidneys, fresh fish, sweetbreads, Liebig's extract, beer and wine are allowed in moderation. Cocoa, coffee and tea are allowed in amounts sufficient only to color milk. Foods advised to be taken in large quantities are milk, fruits of all kinds, salads, vegetables, and salt-free butter. Phosphorized cod liver oil and certain mineral preparations are advised in addition to the diet. The mineral compounds advised contain calcium, magnesium, strontium, sodium, bismuth and aluminum as cations and, as anions, phosphate, sulphate, thiosulphate, silicic acid, carbonate, bromide, salicylate and lactate. A definite attempt is made to keep down the intake of sodium chloride and increase the intake of the other minerals.

In addition to the minerals, the vitamins, of course, are of importance, and their importance in recent years has been greatly stressed. Vitamin additions were made to the ordinary diet in the treatment of tuberculous enteritis by Dr. Mack McConkey, of the New York State Hospital, at Raybrook, New York, and marked benefit apparently resulted from the use of these substances.

In the research department of the City of Chicago Municipal Tuberculosis Sanitarium, for the past several years, there has been intensive study on the influence of diet in animal tuberculosis It has been established only in the last two years that adequate vitamins and minerals in definitely proportioned amounts determine the question of susceptibility or resistance to disease.

On certain deficiency diets animals have become prone to tuberculosis, have developed the disease, and have had the tuberculosis healed when the diet formula was changed to one which was adequate.

Insofar as animal experimentation is concerned, the solution of the diet problem seems almost complete. Our next step was to carry the lesson learned in the laboratories to the bedside. In the past few months we have been modifying and applying the les-

sons gained from animal experimentation to groups of tuberculous individuals. We hope before many months have elapsed that we will have something concrete to offer along this line.

We believe that results already obtained indicate that a diet plan along scientific lines will be, perhaps, the most important factor in the cure of tuberculosis. New discoveries are in the offing, which seem to confirm this opinion. The teaching that the basic protein, carbohydrate and fat constituents are of importance will be confirmed. In addition, the vitamin and mineral quotients, in their proper balance, given in a diet arranged according to the new formula will be determined as the most important factor in the healing of the tuberculous process. Furthermore, we believe that diet on these principles will prove to be the greatest influence in building up resistance to tubercle growth and in preventing development of the disease in pretuberculous and contact cases.

* * * * *

To summarize, then, today we are instituting more effective measures of prevention. We must, first of all, attempt, insofar as possible, to prevent disease by minimizing infection particularly in childhood, and with this thought in mind exercise a conscientious and continuous supervision of the open case. We knew from experience that exposure to the open case is the most constant etiologic factor in phthisiogenesis. We must, consequently, do everything in our power to prevent undue prolonged or intimate exposure, particularly in childhood. While exogenous superinfection in adult life can not be ruled out, the weight of evidence still points to the endogenous reinfection of an old focus as the usual mode of phthisiogenesis.

When exposure has occurred, the contact must be studied and observed over a long period of time, or even indefinitely. Prevention on the basis of artificial immunization does not, as yet, rest on a scientific basis. The possibilities of artificial immunization, however, are so tremendous, if the procedure should ever prove successful, that we can not afford to indulge in destructive criticism.

The tendency today is to supplement the routine procedures of yesterday with the new surgical procedures—crushing of the phrenic nerve, phrenico-exeresis, extrapleural pneumolysis, and thoracoplasty. Even in the matter of the early case, the new procedures have a scope of usefulness and the potentialities of this field are being more fully realized day after day.

The tendency, today, finally, is to emphasize the importance of diet, both in the treatment of tuberculosis and in the field of tuberculosis prevention. New work both in Germany and the United States indicates that the minerals and vitamins, in their proper ratios, are essential for the healing of the tuberculous lesion.

On the whole, the tendency, as may be erroneously supposed from this paper, is not *away* from the time honored triad—rest, fresh air and food. This triad still forms, as it were, the heart of the therapy problem and must remain. We are, however, today not content with the therapeutic potentialities of the triad per se; the tendency is to supplement the therapeutic value of rest, fresh air and food with the newer measures which science and surgery have placed at our disposal.

Ophthalmoplegia and Graves' Disease*

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IF one may judge from the literature ophthalmoplegia as a sign of Graves' disease is extremely rare. Yet other eye signs as exophthalmos, lack of coordination between the movements of the upper lid and the elevation or depression of the visual axis and many others are well recognized and constitute some of the cardinal signs of exophthalmic goiter. Heuer (1) in 1916 reviewed the literature of the disturbance in function of the cranial nerves associated with exophthalmic goiter and reported a case of external ophthalmoplegia with Graves' disease. He pointed out how infrequently it occurred but that the ocular muscles were the most frequently involved of the cranial nerves. He discussed the possible mechanism of the development of the phenomenon but arrived at no definite conclusion. Holloway, Fry and Wentworth (2) recently studied in detail the ocular signs in one hundred unselected cases of goiter and mention that in two cases of goiter they observed paresis of the superior oblique muscles.

Because a complete ophthalmoplegia externa preceded other clinical signs and symptoms of a typical Graves' disease syndrome by months, the following case is reported:

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CASE REPORT

W. S., a Jew, age forty, married and an insurance agent by occupation, was first admitted to the Ophthalmology Out Patient Clinic of the University of Michigan Hospital October 11, 1927. He complained of drooping of the left upper eyelid and diplopia for six months previous. The ptosis at times varied in degree. Fourteen months previous he had what was called rheumatism and some abscessed teeth were removed, also his tonsils. Examination revealed normal pupillary reactions and vision O.D. 4/30, O.S. 6/30. There was a slight exophthalmos and suspicion of lid lag with partial paralysis of the external rectus O.U. and of the muscles supplied by the third cranial nerves, more marked in O.S. Convergence was limited. The fundus showed slight perivasculitis. The visual fields were contracted. Other cranial nerves functioned normally. The tendon and skin reflexes were normal and all forms of deep and superficial sensation were present. There was roentgenographic evidence of a left maxillary sinusitis. Skull X-rays were normal, as also those of the chest. Blood and spinal fluid Wassermann tests were negative. The spinal fluid examination was normal in all respects.

On February 23, 1928, the patient reported that for a while the ptosis of the left lid was much improved. His appetite was poor and he felt tired most of the time. He now weighed one hundred twenty-eight pounds and nine months previous his weight was one hundred forty-eight pounds. There was practically a complete bilateral external ophthalmoplegia but otherwise the neurological examination was normal. He was worrying about the possibility of permanent visual disability. He was very nervous, ex-

citable and perspired freely. Insomnia was a prominent feature of his present state. Shortness of breath and palpitation of the heart on slight exertion existed. The thyroid was not enlarged. There was a fine tremor of the extended hands. On March 10, 1928, the basal metabolic rate was plus 48% with a pulse rate of 112. On March 15, 1928, the basal metabolism was plus 41% with a pulse of 100. Weight at this time was one hundred eight pounds.

On April 4, 1928, after a period of lugolization a subtotal thyroidectomy was done. Pathologic examination of the thyroid tissue was an "over iodized exophthalmic goiter".

The immediate post operative period was uneventful. On May 18, 1928, about six weeks post operative, the patient returned for a check up examination. He reported that he felt "one hundred per cent better." The nervousness and insomnia improved. He now weighed one hundred forty-two pounds. The pulse was still around 100. He looked healthy; however, there was little improvement in the condition of his eyes. The basal metabolic rate was plus 7%.

He was last seen February 6, 1929, and reported his general health to be good. The basal metabolism was minus 2% with an average pulse rate of 80. The differential count showed the lymphocytes to be 46%. The ptosis had improved considerably. Exophthalmos was still very marked. There was some improvement in the excursion of the movements of the eyeballs. He was now back at his usual work.

Comment

At first the etiology of the ophthalmoplegia was somewhat obscure. The usual causes of ophthalmoplegia at this age could be easily ruled out except for possibly myasthenia gravis. Ophthalmoplegia is usually the first manifestation of myasthenia gravis but is soon followed by bulbar palsies. Even after the ophthalmoplegia became almost complete no signs of further palsies presented themselves. Coincident with the ophthalmoplegia or shortly after its onset other manifestations such as nervousness, tremor, loss of weight, etc., etc., directed our attention to the possibility of thyrotoxicosis. In support of this presumption additional evidence of a striking rise in the metabolic rate was obtained and the clinical course following thyroidectomy leaves little doubt in the minds of the most critical as to the presence of thyrotoxicosis.

While ophthalmoplegia is almost always said to be present in true cases of myasthenia gravis, one should keep in mind that it is strictly speaking neither a paralysis nor a paresis. It is a peculiar tiring of the muscles after exertion and rapid recovery after rest. In our case, rest did not seem to relieve the functional disability.

Myasthenia is recognized as a common symptom of myasthenia gravis and Graves' disease. In myasthenia gravis the basal metabolism is usually below normal. In two cases of myasthenia gravis recently studied by the author and showing the typical ophthalmoplegia, myasthenia, bulbar weakness and typical electrical reactions, the basal metabolism was in one case on one occasion minus 23% and on another minus 24%, and in the other case minus 9%.

Many observers have noted a typical lymphorrhagic infiltration of the muscles in myasthenia gravis and this has now been accepted by many as pathognomonic of the disease. Dudgeon and Urquhart (3) have recently shown lymphorrhages in the muscles of eight out of nine cases of exophthalmic goiter and they have been most marked in

the ocular muscles. The muscles in proximity to the lymphorrhages may show atrophic changes while an interstitial myositis is by no means uncommon.

Changes in the thymus are common both in myasthenia gravis and exophthalmic goiter. The changes in the thymus in myasthenia gravis vary from normal histologic structure, tumor or a simple hyperplasia. The tumors of the thymus found associated with myasthenia gravis are usually made up of young thymic tissue. Hyperplasia of the thymus in exophthalmic goiter has recently been shown by Potter (4) to exist in all cases.

Conclusion

Myasthenia gravis and exophthalmic goiter present many clinical and pathological features in common. Both may exhibit extreme myasthenia and ocular palsies and pathologically show lymphorrhagic infiltration of the muscles and other evidence of thymicolymphatic constitution. The preponderance of evidence in both conditions points to the likelihood of a tendency to an endocrine dysfunction possibly of congenital thymic origin.

Summary

1. A case of exophthalmic goiter with external ophthalmoplegia preceding the other signs and symptoms is recorded.

2. The close relationship between myasthenia gravis and exophthalmic goiter from the clinical and pathological standpoint is noted.

3. The essential difference in the clinical picture between exophthalmic goiter with ophthalmoplegia and myasthenia gravis is the difference in the basal metabolic rate.

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Hemorrhagic Nephritis*

By James P. O'Hare, M.D., and Esley J. Kirk, M.D., *Boston, Mass.*

It seems desirable to present to you briefly the subject of hemorrhagic nephritis for several reasons:-

(1) Although the disease is fast being recognized as a definite entity, there is still but little in the literature to indicate such recognition.

(2) Undoubtedly many cases are prematurely discharged as cured. Knowledge of the disease and more careful and accurate urinalyses should indicate that the renal lesions persist and that treatment must be continued to avoid a chronic nephritis and death.

(3) Fairly often these cases fall into the hands of the G. U. surgeon because of the hematuria. All too frequently they are subjected to a distressing cystoscopy which could be avoided by a knowledge of the disease and careful microscopic urinalysis.

The object of this talk is to give you a summary of the facts that we have observed during the last few years at the Brigham Hospital.

That the incidence of hemorrhagic nephritis is not great is indicated by the fact that out of a total of 1593 cases of nephritis of all types seen in the first 15 years of this hospital only 36 were diagnosed as "hemorrhagic". We are sure, however, that with the more common recognition of this disease as a separate entity more will be found.

The data to be referred to in the rest of this paper are based on a study of the last 23 cases. A previous paper by O'Hare and Walker* described observations on 18 cases seen in our wards previous to 1923. Five of the earlier cases are included in this series.

Information concerning the etiology of this disease may be gathered from a glance at Table 1.

This indicates that by far the commonest cause of the disease is an upper respiratory infection. Often this was so mild that little attention was paid to it at the time. Frequently, too, we believe that the initial attack of the nephritis is so mild that it fails to be recognized and much valuable time is lost. Closer observation suggests that most of the antecedent infections are those attributed usually to the streptococcus. This possible relationship seems to be borne out by skin tests done by Dr. Derrick. Seven of our cases have been tested thus far and every one of them indicates a sen-

*From the Medical Clinic of the Peter Bent Brigham Hospital. Read at a meeting of the American College of Physicians, April 8-12, 1929.

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*Atlantic Medical Journal, 1923.

TABLE I

Etiology

Upper Respiratory Infections (Tonsillitis, colds, "grippe", etc.)	12
Rheumatic Fever	3
Scarlet Fever	3
Unknown	3
Intestinal Obstruction	1
Osteomyelitis	1
	23

sitivity to these organisms. Five are sensitive to hemolytic streptococcus and two to the viridans strain. By contrast, skin tests done on other types of nephritis thus far indicate that the majority are non-sensitive.

A few words concerning the pathology of the disease are in order. The disease in the acute stages is so rarely fatal that almost no pathological observations are available. When it has been possible to observe the pathology, it has proved to be a subacute and chronic glomerular nephritis. The more acute lesions are represented by thromboses of afferent glomerular vessels, hyalinization of capillary walls, and rupture of these with hemorrhage into the capsule or into the tuft itself forming a lake of blood. All stages of glomerular injury from these lesions to complete obliteration may usually be seen in the same slide. The subtended tubules atrophy, but no very active degeneration is observed. The marked variability in the degree of glomerular injury suggests that the persistence of the microscopic hematuria is due to the progressive injury to one glomerulus after another.

Clinically the disease starts much like any acute nephritis following an infection. Edema is as a rule relatively mild. Although one cannot always make the proper diagnosis with certainty in the early stages, one can suspect it by the great predominance of red cells in the urinary sediment. In a comparatively few days the edema disappears and the ratio between red cells and white cells or small round cells seems to increase, though a count of the total number of red cells might actually show a decrease. In the course of a period varying from several days to a few weeks the cellular and granular casts materially lessen, the white blood cells and the renal epithelial cells practically disappear, leaving a sediment consisting almost entirely of erythrocytes and a few hyaline or red blood cell casts. In the meantime, the amount of albumin has fallen from a trace to a very slight trace or even less. This is the dangerous period because while some clear up entirely in a short time, many are discharged at this point because the doctor pays too little attention to the small amount of albumin and the slight microscopic bleeding. The common story is for the patient to continue to bleed in small amounts with a sharp flare-up following each cold or other infection until eventually the function of the kidney falls, the blood pressure rises and uremia and death occur. Occasionally hemorrhagic nephritis changes to or

becomes complicated with another type of nephritis. Three of our group originally diagnosed hemorrhagic nephritis are now fairly typical nephrosis patients.

One might think that with the more or less continuous bleeding anemia would be marked. This is, however, not the case. For a long time the bone marrow seems able to take care of the slight but continuous blood loss. Eventually a mild secondary anemia occurs. The figures for 14 cases in which special attention was given to the blood findings are indicated in Table II.

TABLE II

	No. of Cases	*Findings*
Blood Calcium	6	Normal
Clotting Time	14	7 prolonged
Bleeding Time	14	1 prolonged
Platelets	14	8 decreased (mod. sodium citrate method)
Fibrinogen	12	0 low; 9 high; 3 normal
Rbc	14	Av. 3,500,000
Hbg	14	Av. 70-75 per cent

This table indicates that there is no consistent lack of any elements dealing with coagulation of the blood although the clotting time was somewhat prolonged in about one half of our cases and the platelet count was decreased in more than one half. The fibrinogen was actually increased in most of our group. We know of no reason for this last.

The prognosis is indicated by Table III.

TABLE III

No. of cases	23	
Dead	2	
Living	21	
	Recovered completely	10
	Chronic Hemorrhagic Nephritis	8
	Nephrosis	3

This table suggests that slightly less than one half of these patients recover. The two patients that died lived about six years from the time the lesion was first diagnosed. On the other hand, we know at least one patient that is still alive eight years after the onset of the disease and when last seen two years ago showed persistent hematuria.

As far as the differential diagnosis is concerned, it should be said that in the most acute stage no certain diagnosis may be possible. The diagnosis may be suspected, however, from the abundance of blood and the slight edema. After the subacute stage is reached, however, there should be no difficulty in differentiating this disorder from anything else by any one who understands the history of the disease and who can and does make careful microscopic urinalyses. Whenever one finds a urinary sediment containing red

blood cells varying in number from 4 or 5 per h.p.f. to 200 per h.p.f., with only a rare white blood cell, prolonged search should be made for red cell, hyaline or fine brown granular casts. The finding of even a few of these especially the first, practically clinches the diagnosis. Of course, it is possible to find casts in an elderly individual who has bleeding from a stone, papilloma, prostatic disease, etc. However, it is extremely rare for such a patient not to indicate the source of his bleeding in other ways. We feel very strongly that many patients could avoid a painful cystoscopy if more intelligent study was made of the patient as a whole and especially of his urinary sediment.

The treatment of this disease is but little different from that of the ordinary acute or chronic nephritic patient, except perhaps in one particular. The patient should be kept at rest in bed until all red cells have disappeared, even if it means months of this treatment. His only chance for a complete recovery seems to be to bring about a complete cessation of bleeding before a chronic lesion develops. Not until one has kept his patient in bed several months and has thoroughly convinced himself that the hematuria is not going to cease should he give up and allow the patient up and about. The only other item worthy of emphasis is that these patients should not receive an unduly low protein ration. Such a dietetic error might be responsible for increasing the anemia and, possibly, thereby increasing the tendency to bleed. When there is no nitrogen retention and no very acute lesion the patient should receive a salt poor diet containing 1 gram of protein per kilo body weight. The fluid intake should be 1500-2000 cc. in 24 hours.

All foci infection should be diligently sought for and eradicated, especially since the streptococcus seems to play such an important rôle in this disease.

Up to now, no methods aimed directly at stopping the hematuria have been successful in our experience. We have tried calcium, ergot, adrenalin, vaccines, transfusion and even decapsulation without avail.

Our work with the desensitization to the specific streptococcus is too new and too brief to justify any discussion. However, the results obtained thus far are encouraging.

Arachnidism

A Report of Five Cases of Spider Poisoning,

By J. B. Ellis, M.D., *Helena, Ark.*

ONLY recently, despite thirty years of general practice, have I had my first experience with spider bite poisoning, and these experiences have come in such rapid succession that I am able to report five cases of markedly uniform character which have come under my observation within a short period of time. So rare are such cases in this section of the country that, in the first instance, spider bite poisoning did not occur to me even as a remote possibility. In that case the venomous arachnid was encountered in the dark and was therefore not seen, but in the second, third and fifth cases the offending spider was caught and positively identified as the *Latrodectus mactans,* probably the only poisonous spider in the United States.*

History of the Latrodectus Mactans

Investigation yields abundant evidence that the bite of the shiny black Latrodectus is attended with severe systemic poisoning. Numerous recorders in European and South American countries, and even in far-away New Zealand, Australia and Madagascar, have reported many cases, even virtual epidemics of arachnidism. In the United States it seems to be much more rare; nevertheless, here also it has been established as a clinical entity. During the last century more than one hundred fifty cases of poisonous spider bites have been reported by thirty-three physicians*, mainly from the southern half of the country and especially from California, some of the cases resulting in death. Numbers of cases perhaps go unrecognized because of the unusual and often obscure cause. Since rather extended inquiry reveals my experience with spider bite poisoning to be unique in Eastern Arkansas, possibly also in the Mid-South, I make this report in an effort to stress the importance of and to aid in its clinical recognition.

Description

The Arachnida perpetuate the name af Arachne, a Lydian maiden turned into a spider by Minerva for presuming to compete with her in weaving and embroidery, and the particular and pernicious species with which we are concerned in these five cases, the *Latrodectus mactans,* enjoys numerous popular pseudonyms in addition

*Reference: ARACHNIDISM—A Study in Spider Poisoning, by Emil Bogen, M.D., Los Angeles. The Journal of the American Medical Association, Vol. LXXXVI, June 19, 1926, pp. 1894-96.

to its many and more dignified scientific synonyms. The California Indians called it the "po-ko-moo". It was their custom to mash it and rub the points of their arrows in it. This virulent arachnid is shiny and coal-black in appearance, the globose abdomen variously marked on the ventral surface with brilliant spots and stripes of red or yellow or both. The most constant of these markings is a bright red patch, shaped like an hour-glass, which gives rise to the name, "hourglass" spider. The abdomen is somewhat larger than the cephalothorax, and it so resembles a black shoe button that "shoe-button" spider is a common appellation. The female is much larger than the male, less brilliantly marked, and is always responsible for the bites. In addition, she adheres to the custom of eating her mate and has thus won the deserved sobriquet of the "black widow". What excellent proof of that oft-repeated assertion that the female of the species is more deadly than the male! The black widow is not infrequently half an inch long, when fully grown, and the spread of the long glossy legs may be as much as two inches.

This noxious spider builds for its home a coarse and irregular dark web, hidden in the seclusion of dimly lighted, undisturbed places. It is not infrequently encountered in outdoor privies, as was the experience in each of the cases under my observation, and there it often weaves its web across the seat of the toilet. It will, however, occasionally take up its abode under stones, and in holes, stumps and bushes, as well as frame buildings.

CASE REPORTS

Case I: J. H., male, colored, aged 39, farmer, residing 18 miles from Helena, Ark.

Case II: J. H., male, white, aged 24, teacher, residing at Barton, Ark.

Case III. W. H. G., male, white, aged 47, merchant and planter, residing at Barton, Ark.

Case IV: W. J., male, white, age 36, farmer, residing two miles west of Barton, Ark.

Case V: J. E. B., male, white, age 40, farmer, residing two miles south of Barton, Ark.

The marked similarity of these five cases admits of one description of all. The patients were all males, four white and one colored, all resided in the same section of Eastern Arkansas, each was bitten on the glans penis while in an outdoor privy, all came under my observation from one and one-half to two hours after being bitten, and all reacted to the poison in like manner.

The first symptom in each case was acute burning pain at the site of the bite. This was followed approximately thirty minutes later by severe backache, headache, cramping, aching pain in the abdomen and legs. Each patient experienced sensations of the entire body, swelling, sensations of heat and cold in the body and legs, profuse perspiration, extreme restlessness, and rapid and difficult breathing.

While all five of these cases were tossing and moaning in an agony of pain when admitted for examination, in no instance was there any swelling in the parts inoculated by the bite. The only evidence of the bite was a small red spot, about the size of the head of an ordinary pin, which cleared up in three or four days. In each case the

abdomen was tense with an extreme board-like rigidity, but no tenderness was noticeable. The reflexes were increased in every instance, the blood pressure slightly above normal, the temperature subnormal and the pulse regular but weak and slow, ranging from 60 to 65. In only one instance was it possible to make blood and urine analyses. Case III, W. H. G., age 47, showed a leukocytosis of 16,800, 80% neutrophiles, and the urine showed a trace of albumin and some hyaline and granular casts. In all the cases severe constipation followed, probably due to the large amount of opiates necessary to relieve the acute symptoms.

The clinical course varied little in these cases. Within approximately half an hour after the sharp, stinging bite, the onset of the acute symptoms began, and each patient was certainly very sick for a few hours. During the next twenty-four hours pains like a multiple neuritis of arms and legs developed. The symptoms gradually receded but did not disappear for several days.

Treatment

Fortunately all five of these cases recovered. The treatment was uniform, consisting of (1) a sedative, (2) a stimulant, and (3) eliminative measures. It was necessary to give each of the first four ¾ gr. of morphine to effect any relief from the acute symptoms, but the fifth patient required only ¼ gr., for he evidently possessed a measure of immunity, due to inoculation from a slight bite received a short time before. The stimulant administered was in each case an ampule of caffeine sodium benzoate. Fluids were given freely and such purgatives employed as were necessary to relieve the severe constipation. No local treatment was administered at the site of the inoculation.

Unique Feature of Case V.

Case V. is worthy of special consideration in that this patient was twice bitten and reacted less severely to the second bite than the other four did to their initial bites, although this second bite was probably of like intensity with theirs. He reported having been bitten, only slightly, however, two weeks prior to coming under my observation. While this slight bite made him ill, he was able to recuperate from the acute symptoms in two or three hours and did not consult a physician. The symptoms caused by the second and more severe bite two weeks later were identical with those of the other four cases except that they were not as acute and it did not require as much opiate to relieve them. Apparently this unique condition was due to a state of partial immunity conferred by the previous inoculation. The evidence in this particular case points definitely to the conclusion that the primary inoculation, even though slight, established a degree of immunity which caused the second and more severe inoculation, following just two weeks later, to produce comparatively mild symptoms.

Conclusion

My experience with the five cases here cited is not only indicative of the presence of the Latrodectus mactans in this section, since it has been definitely identified, but it also illustrates

that arachnidism presents so striking a clinical entity that, once considered as a possibility, the diagnosis is easily made. The history of Case V points to the conclusion that immune blood offers the most logical and effective specific. A study of fifteen cases of this malady in the Los Angeles General Hospital bears out this conclusion. While Bogen's results were not conclusive, intramuscular injection of convalescent serum proved sufficiently efficacious, when such treatment was used, to warrant continuation of its use and the keeping of a supply of the serum on hand. Should the poisonous black widow infest this section of Eastern Arkansas, it is my belief that such serum would prove to be of definite therapeutic value, if not, indeed, the ideal remedy for this singularly striking affection.

Medical Genius and Contemporary Criticism

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THE concept "Genius" in medicine is difficult to formulate and to define accurately. That genius is a natural gift, something born within a man, the word itself implies. Some would define it as a spontaneous faculty of the mind which accomplishes remarkable things without apparent effort. Yet the genius that has won the greatest and most enduring success has been joined with tireless industry and painstaking. There is an old saying that genius consists in sufficient patience. For convenience let us think here of the word as designating great men in medical history who, whatever their status may be to the psychologist, nevertheless stand out as having contributed in a definite, if not epoch-making way to the growth of truth.

The history of medicine is, in the main, a recount of the biography of great men. As we read about them we applaud with one accord their great works, their important discoveries. We read volumes of praise of them. We honour them. History is kind to great men, the geniuses; much more kind than their contemporaries were. Posterity would rather preserve the words of honour than the words of condemnation. Unfortunately however, the contemporaries of a man whom history has shown to be a genius viewed him in a far different light than we do. A man who makes a discovery is rarely understood at the time because he introduces some conception which is contrary to the ingrained belief of people. A genius is always a step ahead of the men of his time. It may be a short stride or a long jump according to the nature of his discovery and the time he lived in. In any case he always stands apart, thinks above his fellows. The farther apart he stands the more he is misunderstood. Two kinds of men there are whose minds work on a different plane from those around them, the genius and the lunatic. It sometimes occurs that the two are confused, and time alone is left to determine what the verdict of the majority will be. Thus Dryden wrote:

"Great wits are sure to madness near allied
And thin partitions do their bounds divide."

This attitude of contemporaries should not have been so evident in the realm of medicine because discoveries in science were and must be always based on experiment and proof. Science does not countenance groundless theory. "He alone discovers who proves", is the dictum. Therefore it is all the more astonishing on the face of things that the genius of science was never understood. But the truth

is that while science accepts proof, contemporary critics are often blind to the very strongest proof. Contemporaries are human and fallible and are therefore bound to certain limitations of mind and prejudices. "There's none so blind as the man who *wont* see".

Of all their prejudices and weakness the greatest is undoubtedly the rigid adherence to authority and tradition. It is characteristic of people that they have heroes and are reluctant to have their ideas overthrown. Their hero may be a genius of past ages, later recognized and worshipped, *e. g.*, Hippocrates, Galen, Hunter. Their hero may be in the form of a religious belief or an old ingrained tradition. In any case, old *Authority* is always the enemy of Genius. Then too, it may be loyalty to a present authority, a personal partisan spirit. People are often unwilling to accept simple explanations because they appear as an insult to their intelligence, as in the case of Semmelweis and Lister. On the other hand the new idea may be too complex for them, as in Harvey's case. Then too there is always the natural inertia of men's minds. Even though a discovery may point out an opportunity for easier and safer going, the minds of people have a tendency to jog along in their old ruts.

Circumstances, then, of a varying character may determine the reception accorded to great advances in science. A discovery made before the world is ready for it, is far more apt to be neglected than acclaimed. The path of genius is never smooth. Walter Bagehot says that the pain of a new idea is one of the greatest pains to human nature. The influences which determine the reception of genius may perhaps be thought of under three main headings. First there is the influence of the period and the state of knowledge at the time; secondly the influence of personal elements, tradition, mental inertia, jealousy, and so on; and lastly the influence of circumstance, chance, and local conditions, tricks of fortune. The study of biography can never be at its full interest unless the man is placed in his true perspective. This comprehends a knowledge of his time, his contemporaries, what people thought and did when he lived, the forces which influenced their life as well as his.

It is unfortunate that so often the writings of contemporaries are not available to us. Too often we must be content with the bare cold facts which history has recorded that a man of genius met with praise and honour by his fellows or, too often, was scorned, neglected or even persecuted. Some of the refutations of contemporary critics seem perhaps too ridiculous to be interesting to us, but it must be remembered that these men were products of their own age, and had firmly ingrafted in their minds a *reason* for things. People would rather explain phenomena the way it pleases them. Consequently when someone raises this reason to question it was in many cases considered an insult to their mentality as well as to their honoured traditions. Mysticism, superstition and undue reverence for authority, together with the great tendency to confuse hypothesis with fact have probably been the chief factors

in retarding progress; and through all ages these have stuck like black shadows to the onward march of Truth.

Let us consider a few men who have shone as geniuses in medical history. They have been chosen it must be admitted more or less at random from amongst the many luminaries of science, but perhaps they will serve as types to illustrate the point.

It is perhaps fitting to mention Vesalius first because he of all the courageous spirits of the renaissance was the great pioneer in scientific medicine. "He was the commanding figure of the 16th century", says Garrison. The renaissance of course swept over Europe like a great wave. The revival of learning was evident in all branches of thought. In medicine the great reform was initiated by Vesalius for it was he who first realized the necessity of dissection of the human body to determine its structure. But the idea really carried more import than that because, strange as it may seem, the method of experiment was never before considered necessary in the study of medicine. Dissection is experimental anatomy. Not until seventy years later did Harvey bring physiology into medicine on the same basis. So then we may say that Vesalius first wielded the most powerful lever of scientific advance in medicine, the method of experiment. Before Vesalius, dissection was generally looked down upon and indeed considered unnecessary. What anatomy was studied was taken verbatim from the works of Galen, who lived more than thirteen centuries previous. Galen's word was law. It would almost seem that men would sooner disbelieve their eyes than question the works of Galen. When permission was asked of the Church to dissect human bodies, the authorities answered, "It is not necessary unless Galen has made a mistake, and he has not made a mistake, therefore it is not necessary."

Vesalius revolted. Although a scholar and strictly trained in the opinions of his time, he abandoned all prejudice. He began by doubting all authority and investigating for himself with a mind keen and independent. His untiring dissection soon proved Galen at error in many things. Vesalius completed his task at the early age of 28, and published his immortal work, the "Fabrica" in 1543.

How was he received? His book raised a perfect storm. Nearly everyone was against him for daring to question the authority of Galen. His own teacher, Sylvius, published a scathing attack. He continued his work, but things became so unpleasant for him that in a fit of discouragement he burned his manuscripts. Even later, in his position of private physician to Charles V, his critics persecuted him. Finally on the ridiculous pretext that the heart of a man on whom he was doing a post-mortem was seen to flutter, his enemies brought him before the inquisition, and he only escaped being put to death by the intervention of the king, and by promising to make a pilgrimage to the Holy Land. On his return he was shipwrecked and died. It is said he was in such penury that his remains would have been devoured by wild beasts had not a kind goldsmith paid his funeral charges.

Quite different was the treatment a few years later of Ambroise Paré whom we know now as one of the greatest surgeons of all time and a peer of Hunter and Lister. Paré was the only Protestant to be spared in the massacre of St. Bartholomew. Charles IX, "While crying kill, kill, wished to save no one except Master Ambroise Paré his first surgeon. On the eve of the massacre he sent to seek him and for him to come to the royal chamber, commanding him not to budge from it, and said that it was not right that one who could save so many poor people should be thus massacred, and that he would not press him to change his religion any more than he would his nurse."

Paré, who was in a way as great an iconoclast as Vesalius, may be said to have met with more favourable contemporary criticism for two reasons; first because of his extraordinary personal magnetism and popularity, secondly because he was of immediate practical benefit to people.

In the beginning of the 17th century came Harvey, as Welch remarks "bringing to light in the demonstration of the circulation of the blood the central fact of physiology." Although Galen had lost his anatomical throne to Vesalius he still ruled absolutely in all conceptions of the functions of the body. It goes without saying that his discovery came out of the freedom of his mind, in keeping with the general liberation of intellect through the renaissance, his diligence in experimentation and observation; and finally it was made possible through that rare quality of mind we know as genius.

Omitting any reference to his education, life and character, we pause and try to picture to ourselves the situation on that great day, April 17th, 1616, a week before Shakespeare's death, when William Harvey announced his discovery. Osler paints for us very vividly the scene as Harvey stood before a small gathering and expounded his views before his fellows in the Royal College of Physicians. Rumor had spread abroad about strange things to be expressed by the lecturer. What were these men to think of young Harvey's ideas when they had been taught Galen's teaching, which said that the heart is a lamp, which is furnished with oil by the blood and air from the lungs, and that the liver was the source of the blood? Yet how were they to deny the truth of Harvey's experiment before their eyes? "Probably few in the lecture room" says Osler, "appreciated the full meaning of Harvey's words." It is unfortunate that we have no contemporary account of the impression made on some of the greater men present on that day. Here we find an example of the natural inertia of men's minds. It was too much for them. Probably they loudly applauded his address but the true import of his words fell on barren ground. Osler said that as far as he knew there was no reference to show that the lectures had any immediate influence on the profession, or that anybody outside of the few hearers ever heard about the matter at all. But Harvey himself says "these views as usual pleased some, others less; some chid me and calumniated me and laid it to me as a crime that I had dared to depart from the precepts and

opinions of all anatomists." Their mental state we can only understand by a careful examination of the history and general thought at Harvey's time. Such a heresy as a general circulation was too much for them.

Althought Harvey continued to experiment and expound his views without effect, he delayed twelve years any publication. Osler says, "he seems to have belonged to that interesting type of men who know too much to write." That may be so, but after reading Harvey's introduction to his work which finally appeared, it strikes me that he really dreaded the inevitable prejudices and attacks of his contemporaries. He must have had the persecution of Vesalius as a vivid example. He was too great a genius.

Sir Humphry Rolleston, in a recent essay, has brought to light the writings of two contemporaries of Harvey, viz., Thomas Winston and Henry Power. In the case of the first man, a professor of anatomy at the College, it was shown that Harvey's doctrine was regarded as a fantastic idea, unworthy of serious attention and on the face of it absurd. But Power's attitude was that of a faithful disciple of Harvey. This contemporary however, was much younger than the first. Just here it might be pointed out that it is usually the younger men who accept new ideas with the greatest favour, just as in young countries where the civilization is recent, *e.g.*, Russia, innovations are more readily acclaimed. Although William Harvey saw the new doctrine established in England during his life-time, it continued to be bitterly opposed in France for nearly half a century.

An important explanation of the poor acceptance of the discovery of the circulation is that there was nothing in it which was connected immediately into any practical value to people. Men may sometimes embrace a discovery no matter how upsetting it is if they can see a distinct advantage or profit to come of it. But the true merit of Harvey's work was not so much his demonstration of the circulation of the blood but his method, for with this start physiology became dynamic science. "I am of the opinion" said Harvey, "that our first duty is to enquire whether a thing be or not before asking wherefore it is." Osler says, "It is pleasant to notice that our old friend Sir Thomas Browne, with his love of paradox declared that he preferred the circulation of the blood to the discovery of America."

That envy and jealousy have often played a part in criticism has been mentioned. It was particularly so, it seems, in the lives of some of the men we are going to touch upon now. In this connection perhaps it would not seem too much of a hyperbole to glance back into the realms of mythology, where we read how Aesculapius, the mythical father of the healing art, was treated by his contemporaries. Even he was not exempt from jealousy, for we are told that when he became so proficient in his art that he was able even to raise Hippolytus from the dead, Jupiter, alarmed at this usurping of a gift of the Gods alone, slew him with a thunder-bolt.

It has already been observed how discoveries of purely scientific interest were likely to be poorly received.

It is to be noted too that the work of a genius who was obscure socially or professionally was more apt to escape notice or recognition. How then shall we account for the cold reception and the fifty years' neglect of an epoch-making discovery by a man who was a leading physician and an intimate friend of an emperor? Leopold Auenbrugger invented the art of percussion of the chest in 1753, practised it for seven years and then wrote a book about it. A small book it was, of ninety-five pages, but it will remain for ever as a medical classic.

Auenbrugger belonged to the Vienna School, but the Vienna School rejected him. We shall see that he was not the only genius they let slip by unrecognized. The men among whom he lived and worked never took up the discovery in spite of the fact that Auenbrugger practised it with great success and tried in his modest way to make the new method known. He remained entirely unappreciated until Corvisart in France, rediscovered Auenbrugger's art and translated his book. This was forty-seven years after its publication.

It was as a young man in his early thirties that Auenbrugger began to use percussion in his diagnostic work as physician in the finest hospital in Vienna at that time. It was not stumbled upon by chance, but was quite evidently a carefully worked-out clinical method, backed by an abundance of the keenest observations. To be convinced that it was the work of a genius one has only to read his little book, terse, to the point, a masterful recital of facts and deductions.

There is a good deal of sadness surrounding these stories of medical discovery. Auenbrugger foresaw what his fate would be before he published his work. I shall quote the preface to his little book. It shows well his modesty as well as his foresight. "I here present the reader with a new sign which I have discovered for detecting diseases of the chest. This consists in the percussion of the human thorax, whereby, according to the character of the particular sounds thence elicited, an opinion is formed of the internal state of that cavity. In making public my discoveries respecting this matter I have been actuated neither by an itch for writing, nor a fondness for speculation, but by the desire of submitting to my brethren the fruits of seven years observations and reflection. In doing so I have not been unconscious of the dangers I must encounter; since it has always been the fate of those who have illustrated or improved the arts and sciences by their discoveries to be beset by envy, malice, hatred, detraction and calumny. This, the common lot I have chosen to undergo, but with the determination of refusing to everyone who is actuated by such motives as these all explanations of my doctrines." But then at the end he adds, "In submitting this to the public I doubt not that I shall be considered by all those who can justly appreciate medical science, as having thereby rendered a grateful service to our art, inasmuch as it must be allowed to throw no small degree of light upon the obscurer diseases of the chest, of which a more perfect knowledge has hitherto been much wanted."

Auenbrugger died in 1809 without ever seeing his work receive proper

recognition. It is somewhat difficult to understand why such a valuable discovery was not accepted sooner. We may state some factors however. "Nearly every one of the great physicians of the time," says Garrison, "stood on a pedestal all his own, and many of these let it be known that they were in possession of private or secret remedies which were superior to all others." It was an age of system-makers and theorists. Such individualism naturally did not favour the general reception of a seeming simple novelty as that of percussion. It accounts too for the tendency to jealousy, that Auenbrugger mentions, which probably would have been less evident in any other age. As factors in his criticism and neglect, then, we have on the one side the natural inherent inertia of men's minds toward anything new, coupled often with envy; and on the part of Auenbrugger an innate modesty and want of assertiveness, a certain serenity of nature, loving science for its own sake.

So Auenbrugger was one of those unfortunate geniuses who discover a truth prematurely but are not gifted by nature with the ability to proclaim it convincingly to the world. We shall consider presently another example of this in Semmelweis. But after all, these men are compensated in a way. For surely the very consciousness of duty done must have sustained them. I think it is safe to say that all really great discoveries were the outcome of pure scientific interest alone and did not come from trying for a practical result and material recompense. Scientists, and physicians particularly, tend to become philosophical by the steadying influences of everyday work. The ubiquitous law of compensation so well extolled by Emerson must surely hold true here as elsewhere. "So", says Weir Mitchell, "not even Marcus Aurelius himself could have been more content than Auenbrugger."

In all the history of medicine I doubt if there is a more extraordinary example of blind repudiation of a great discovery than is shown in the story of Ignaz Philipp Semmelweis. At least twenty years before the work of Pasteur and Lister, Semmelweis broke through the shackles of tradition and current teaching and tried to show the world the cause and prevention of puerperal fever. Childbed fever! It had been for centuries the stigma on the name of physicians and hospital practice. "There are but two discoveries in medical history", says Sir William J. Sinclair, "which were of the highest importance in producing *direct* and immediate blessings to the human race, by the saving of life and the prevention of suffering. These were the discoveries of Edward Jenner in vaccination, and Semmelweis in puerperal fever." Of Jenner we have all heard much. Who then was this other genius? His story is so dramatic that it might not be amiss to dwell on it a little.

Briefly then, Semmelweis was born in Hungary in 1818. His school education was deficient, and this lack of mental discipline was a hindrance to him in the controversies of his later life. He had an innate aversion to writing, we are told. But he retained a natural eye with which to look into Nature, undimmed by the teaching of pedants. In 1844 he graduated in med-

icine, and two years later assumed the duties of assistant at the First Obstetrical Clinic in the Vienna General Hospital.

In order to make the work of Semmelweis quite clear it will be necessary to say a word about the hospital and the prevailing systems at the time. The Vienna Clinic was a great institution even at that time, the obstetrical division handling nearly 8000 cases a year. Fifty years before Semmelweis the English methods of midwifery were introduced, in which there was a minimum amount of handling of the women. But in 1822 a new professor began the teaching of obstetrics on the cadaver instead of the manikin. The students and doctors often proceeded straight from the post-mortem room to wards where they examined the patients without, of course, any antiseptic precautions. This practice continued, and when Semmelweis entered the hospital the mortality was appalling. In January 1844, two hundred and forty-two healthy women entered the No. I Obstetrical Clinic. Seventy-one died in spite of the best hospital treatment known then. About one in three died as the direct result of the introduction of virulent organisms into their bodies from the dirty and contaminated hands of the doctors.

Because of the warmth of his human sympathy the heart of Semmelweis was wrung by witnessing around him the suffering and death of thousands of the victims of some baleful agent which had eluded the efforts of generations of investigators to comprehend it. "Consider," says Carlyle, "how the beginning of all Thought worth the name is Love, and the wise head never yet was without first the generous heart." It is not my purpose to give an account of the methods and work which led to the establishment of the etiology of puerperal fever. But let me assure you that the story might well be described as thrilling, and as Sinclair says, "It might remain of perennial value as an example of the application of logical method in working from the known to the unknown in medicine."

Consider the orthodox theories that Semmelweis had been taught regarding puerperal fever which he had to unlearn. It was maintained that it was a disease "sui generis", independent as an entity. Some thought it a milk fever, a milk peritonitis. Others thought it due to a contagion but that this thing assumed the form of a mysterious halo or areola which clung to the unfortunate practitioner who came under its malign influence; never guessing the real cause, filth and contamination from the post-mortem room. Everything from changes in the blood to changes in the weather were given as factors.

An important fact which continually presented a great problem to Semmelweis was as follows. The hospital was divided into two divisions, one for the students and one for the midwives. The midwives of course had little recourse to the post-mortem rooms, otherwise the conditions were about the same in both divisions. *But* the mortality of the first division was always at least three times that of the second. Why was this? With a never-ceasing zeal, Semmelweis attempted to find the answer. "Everywhere questions arose", he says, "everything re-

mained without explanation. All was doubt and difficulty. Only the great number of dead was an undoubted and terrible reality."

Next year, in 1847, a friend, Professor Kolletschka, while doing a post-mortem examination accidentally received a punctured wound in his finger. What followed I recount in the words of Semmelweis himself. "The professor thereupon became affected with lymphangitis, phlebitis in the upper extremity and he died from pleurisy, pericarditis, peritonitis and meningitis; and a few days before his death metastases occurred in one of the eyes. In the excited condition in which I then was it rushed into my mind with irresistible clearness that the disease from which he had died was identical with that from which I had seen so many hundreds of lying-in women die. The puerperal women also died from phlebitis, lymphangitis, peritonitis, pleuritis, meningitis, and in them also metastases sometimes occurred. Day and night the vision of Kolletschka's malady haunted me and with ever increasing conviction I recognized the identity of the disease from which he died with the malady which I had observed to carry off so many women. In his case the cause of the disease was the cadaveric material carried into the vascular system. I must therefore put the question to myself: did then the women I have seen die from an identical disease also have cadaveric matter carried into the vascular system? To this question I must answer *yes*."

Semmelweis did not wait. He acted immediately. He says, "In order to destroy the cadaveric material adhering to the hands I began to employ a solution of chloride of lime, with which every doctor and student was required to wash his hands before making an examination. The result was spectacular. Within a few months the mortality of the first division fell below that of the second for the first time in the history of the hospital."

From then on his unceasing work led to more deductions, and he came nearer and nearer to the great discovery which Fate reserved for Lister. How he found that puerperal fever was carried from an infected patient to others; how clinical events took their places in an orderly system in establishing the truth of his doctrine; these make an interesting story. The explanation of why and how decomposed animal matter infects puerperae was to come with later developments of biological science, but the etiology, the cause, as discovered first by Semmelweis, stands today without essential modification as it was announced in 1847.

Now for the reception. Semmelweis had three influential friends, Hebra, Skoda and Rokitansky who had followed his work and now championed his cause, giving him every encouragement to publish his results and doctrine. Skoda, who was himself one of the greatest pioneers in auscultation and percussion had met with ill-usage by the Vienna School. He became an object of derision, and all sorts of obstacles were placed in his way. On the wretched pretext that Skoda hurt the patients and made them worse with his thumping and pressing on their chests he was transferred to the lunatic asylum to practice there. Semmel-

weis showed the most lamentably poor judgment in the dissemination of his doctrine. "He was in a sense his own worst enemy", says Sinclair. When he spoke he stirred up strife and controversies. For those great proud authorities of the day his doctrine was too simple. They refused to believe that the pathology of puerperal fever could be so easily explained. Imagine the control of the disease by simply washing the hands in chlorine water! Too firmly rooted in their minds was the old belief in mysterious, inexplicable, supernatural causes. Semmelweis was looked upon as a faddist. Then there was the inevitable jealousy, and the injury to the pride of men who thought themselves authorities, and who took the undiplomatic remarks of Semmelweis as personal affronts.

But with a chosen few, mostly younger men, the conception took root. Think how close Haller came to Lister's great discovery when in 1849, almost twenty years before the days of antisepsis he spoke of the immeasurable importance of the Semmelweis doctrine for surgery. This was probably the first time in the history of medicine that any suggestion was made regarding prophylaxis or antisepsis in surgery. Sinclair says, "The solemn, conventional professors smiled sarcastically at him. They looked upon Haller as a fantastic enthusiast, and treated his inspiration with contempt."

Semmelweis was completely misunderstood. He was ridiculed and persecuted. His mortification and indignation finally made him mentally unbalanced. He was practically driven from Vienna. Even Virchow sneered at him. The attacks of his enemies embittered his existence and hurried him to the grave.

The extent to which small things and apparently unimportant circumstances have influenced the course of human events has been the subject of "wise saws and modern instances" of philosophers of all ages. In this case I think it is safe to say that if the counsels of Semmelweis had been followed, probably obstetrics instead of surgery would have initiated the greatest advance in medicine which has been made since the beginning of time. For the discoveries of bacteriology from Pasteur onwards, and the work of Lister, as Sinclair says, "only explained and confirmed." They were in no wise conflicting.

It seems to me that the reception of the Semmelweis doctrine must be explained under several headings. The first is personal partisan spirit. One cannot accuse the time and period of Semmelweis as being one of scientific stagnation, for there were great minds then. Nor yet was there blind adherence to tradition, for many old concepts were being overthrown. Nor did the doctrine conflict with religion or politics. But it was an age when a few great authorities were all-powerful. Their personal theories fought for acceptance. An upstart like Semmelweis with little professional or social position was bound to meet with enmity, when he attempted to overthrow all their elaborate theories. It was a personal affront. Yet it is astonishing that his proof of the saving of lives alone was not sufficiently compelling. Secondly the scientific thought of the day tended toward elaborate explanation. The doctrine of Semmelweis was

too simple for his great contemporaries. They must needs use long range glasses with which to look at nature, at the same time invoking the aid of mystical things to explain what they could not see between their ranges of vision. Lastly we should remember the personal deficiency of Semmelweis. He showed the poorest judgment in presenting his case. Had he had the personality of Lister or the literary ability of Oliver Wendell Holmes, his doctrine would probably have conquered Europe in a few months.

At this point let us review for a moment the story of an obscure monk who, seventy-five years ago made a hobby of growing peas in his cloister garden. He observed accurately what happened when different varieties were crossed, and then published his conclusions. These are as important to biology as atomic laws are to chemistry. The monk of course was Gregor Mendel and his discovery and conclusions are known as the Mendelian laws.

It is unnecessary to state here what Mendel's laws were, nor need their importance be stressed. I shall however, quote Professor Oertel who tells us that "quite apart from their great importance as regards heredity, they stand out as a cornerstone in biology because this monk first laid the foundations of experimental biology. The remarkable simplicity of his observations showed him as a true genius. He had neither laboratory nor preparatory education in the sciences. He had, being a priest, an excellent classical education and was a sharp thinker." Whether Professor Oertel believes he was a sharp thinker because of his classical education is uncertain. It is a temptation to quote Hazlitt who says in his essay "On the Ignorance of the Learned", "anyone who has passed through the regular graduations of a classical education and is not made a fool by it may consider himself as having had a very narrow escape."

However what interests us here is the fact that not the slightest attention was paid to the great discovery, and so no use made of it for nearly fifty years, sixteen years after Mendel's death. Mendel fully realized the importance of his discovery for he published his work in an Austrian scientific journal in 1853. There it lay all during Darwin's time, when it could have been of so much value. Finally in 1900, de Vries rediscovered Mendel and confirmed his work. What more striking example could we have of genius unrecognized because the discoverer was by temperament not disposed to advertise or thrust his discovery upon a world which is too apt to be slow at accepting a new idea. It is true Mendel was somewhat isolated by reason of his social and even his geographical position. Nevertheless the outposts of the scientific world were asleep or blind. Even when his work at last came to light he was not immune from attacks, notably by Professor Weldon, who himself had done some work in this connection on the principles of heredity. That he tried to detract from Mendel's importance is putting it mildly. In commending Mendel he effectually "damned with faint praise"; so much so in fact that it led Professor Bateson to write a book, in defence of Mendel. That briefly, is the story of another great

mind "Voyaging through strange seas of thought alone."

Lord Lister. What a name! Is it possible that a man whose work was so epoch-making could have met with anything but praise? What excuse could his critics find? Lister did not himself introduce any new radical theory. The theory of antisepsis was known before his time. History shows that great discoveries are rarely absolute novelties and that they have long existed as toys or curiosities. We have seen how the work of Semmelweis twenty years before was really the same as that of Lister only more limited. Semmelweis was a forerunner, but owing to his neglect was entirely unknown to Lister. The germ theory in connection with disease, Pasteur introduced. It was Lister who vitalized and dramatically proved the theory by demonstrating its practical value. He simply introduced into surgery the principle of antisepsis. It is said that before Lister 70% of all compound fractures and 50% of all major operations resulted in death. As Professor Seelig remarks, "With one sweep this doleful picture was erased."

Lister's work then was of the greatest immediate practical value. Yet in spite of this he met with a storm of bitter criticism. A consideration of this could well be made the subject of a separate study. I shall only mention a few points. His critics might be put into two classes. The first class includes men who stuck on certain non-essentials, as the early difficulties of operative technique, and who failed to grasp the great surgical principle. It is astonishing that so great a man as Sir James Y. Simpson who introduced chloroform anesthesia in obstetrics should have been Lister's greatest opponent, even to the extent of envy and malice. The other class of critics were those who were so utterly tied to old authority that they refused to believe either Pasteur's experiments or Lister's operative results, and considered any fundamental change in surgical practice as an insult to themselves, their practice, and the luminaries in whose train they followed. We might recall many of the leaders of the age who took a decided stand against Lister. For instance, even as late as 1869, the annual address in surgery to the British Medical Association given by Thomas Nunnely was devoted almost entirely to a denunciation of Lister. It is reported at great length in the British Medical Journal for that year. The main argument was that Lister had deserted the precepts of John Hunter. "Lister's method", he says, "ignores those truths which formed the life-long labour of our great physiologist to establish." Nunnely absolutely opposed the germ theory, saying, "this speculation of organic germs is, I fear, far more than an innocent fallacy, its teaching will produce a positive injury." He ends by explaining suppuration of wounds as due to "vital conditions" and "those phases of unhealthy atmosphere or telluric influences." These were the words of one of England's greatest surgeons and a scientist only sixty years ago.

It is interesting to note that these attacks were nearly always couched in the most flowery language which took the place of logical argument. One is reminded of a couplet from Pope:

"Words are like leaves; and where they most abound, much fruit of sense beneath is rarely found."

Pasteur's criticism would fill a book. I shall only quote one example. He had a long dispute with Pouchet about spontaneous generation. Although eventually proved to be entirely wrong in his contention, Pouchet won his case at the time against Pasteur, was wildly acclaimed, and presented with a prize and membership in the Academy of Sciences.

One more example shall we take. Probably the most dramatic instance in the history of Science, of the degree to which authority and tradition influence contemporary opinion, is shown in the case of Charles Darwin. In modern times surely no one man has produced such a revolution in scientific thought. Whatever anticipation of the doctrines may be found in the writings of his predecessors "the broad facts remain", says Professor Seward, "that since the publication and by reason of the publication of 'Origin of the Species' in 1859, the fundamental conceptions and aims of the student of living nature have been completely changed."

It is undoubted that Darwin will always be considered a great genius, although not in the way that he was so much ahead of his time as some of the men we have considered. I should say that if ever the world was ripe for a revolution in scientific thought it was when Charles Darwin touched the match to the fuse. In proof of this there was the tremendous volume of scientific study and work along the Darwinian line which immediately followed. The explosion which ensued was by no means confined to biological thought. Psychology, ethics and cosmology were stirred to their foundations. The upheaval that Darwinism caused in religious thought is notorious. It is to the consideration of this latter that I shall confine most of my remarks here.

To use a colloquial phrase Darwin "started something" in the religious world. It is safe to say that this was farthest from his thought. He was a scientist, pure and simple. "I shall keep out of controversy", he said, "and just give my own facts." Only Truth was his star; and, to quote Hazlitt, "where the pursuit of truth has been the habitual study of any man's life, the love of truth will be his ruling passion." It is not the intention here to weary you with a review of the tremendous flood of religious criticism. Two quotations taken at random will perhaps suffice to remind you of some of the controversies which raged. The first was that of the greatest condenmnation in viewing the scientific victory of Darwin. "Never in the history of Man has so terrific a calamity befallen the race as that which all who look may behold, advancing as a deluge, black with destruction, resistless in might, uprooting our most cherished hopes, engulfing our most precious creed, and burying our highest life in mindless destruction." The second is a more favourable criticism. "I submit that the more men know of actual Christian teaching, its fidelity to the past, and its sincerity in the face of discovery, the more certainly they will judge that the stimulus of doctrine of evolution has produced in the long run, vigour as well as flexi-

bility in the doctrine of the creation of man."

A great new conception such as that of Darwinism, popularized as it soon became, was bound to influence the mass of people. Now religion, the adherence to faith, has been and is a fundamental part of people's minds. Carlyle says that a man's religion is the chief fact with regard to him. Anything which seemingly conflicts with this has in all ages caused a tremendous reaction. In earlier periods it has been at the bottom of the bitterest controversies and political strife, and indeed the bloodiest wars. But while it was inevitable that Darwinism should influence people's thought, religion, *as religion* should never have become mixed up in it. Nothing was surer than that the greatest misconceptions would arise. It became immediately a clash between *authorities,* the authority of religion and the authority of science. But — and here we come to the fundamental difference, and the eternal cause of strife — the authority of religion is Faith, and the authority of science is Fact and deduction in an objective way. Also in men's minds the reconciliation, if there is to be a reconciliation, must be brought about by their own intellectual methods.

In attempting to explain what I mean I shall quote from an essay of Hammerton's in which he discusses science and authority. He says, "Our men of science act, and the laws of scientific investigation compel them to act, as if it were not quite certain that the views of scientific subjects held by those early writers were so final as to render modern investigation superfluous. It is useless to disguise the fact that there is real opposition of method between intellect and faith. All affirmations based upon authority must be treated as if they were doubtful. I mean that the man of science does not treat the affirmations of any priesthood with less respect than the affirmations of his own scientific brethren; he applies with perfect impartiality the same criticism to all affirmations from whatever source they emanate. The intellect does not recognize authority in anyone." I wish to emphasize here, and particularly in respect to Darwin, this factor of adherence to authority and tradition, because it is undoubtedly of the greatest importance in explaining criticism. Hammerton continues; "Whilst the scientist has no wish to offend those who believe in the infallibility of the author of Genesis, he is compelled to conduct his own investigations as if those infallibilities were matters of doubt and not of certainty." How Darwin was misunderstood! We have all heard how the laity accused him of attacking and attempting to overthrow biblical doctrines. This of course Darwin never did. He was a pure scientific investigator. Darwin was never dogmatic. If he challenged a certain rigidity of religious thought he did it all unconsciously. Hammerton concludes, "Although the intellectual (and scientific) methods are entirely independent of tradition, it may easily happen that the indirect results of our following those methods may be the overthrow of some dogma which has for generations been considered indispensable to man's spiritual welfare. With regard to this contingency it need only be observed that the intel-

lectual forces of humanity must act, like floods and winds, *according to their own laws;* and that if they cast down any edifice too weak to resist them, it must be because the original constructors had not built it substantially, or because those placed in charge of it had neglected to keep it in repair. This is their business, not ours. Our work is simply to ascertain truth by our own independent methods, alike without hostility to any persons claiming authority, and without deference to them."

That this was Darwin's method we cannot doubt. Nor can we doubt that it is the method of all geniuses of science. These forerunners of the truth were able to see clearly and to deduce correctly. Darwin tells us, "I have steadily endeavoured to keep my mind free so as to give up any hypothesis, however much beloved, as soon as facts are shown to be opposed to it." Again he says, "It is a golden rule, which I try to follow, to put every fact which is opposed to one's preconceived opinion in the strongest light. Absolute accuracy is the hardest merit to attain, and the highest merit. Any deviation is ruin."

This brings us practically to our own day. Times are changing. Probably the recognition and favourable reception of genius is much more likely to be immediate and sure now-a-days, than in the past. Osler illustrated this very nicely when he said, "It is interesting to compare the cordial welcome of the pallid spirochaete with the chilly reception of the tubercle bacillus." The reasons for this are many and would make an interesting study. We are better prepared to-day and discoveries are immediately put to the test by experts. Possibly the danger of the present day is to be too credulous and to accept every wind of doctrine, mixing the dross with the gold. Bramwell of Edinburgh spoke of this not long ago in an address entitled "Progress of Medicine and the Retarding Influence of Credulity."

If it be true that human nature is essentially the same through the ages, then the geniuses of to-day and those yet unborn must face essentially the same forces of contemporary criticism. Great minds all too soon vanish into the grave. What a pity we cannot always recognize them while they are here. Science it is true builds forever, but the genius together with the charlatan and the fool is mortal and is soon lost to us.

This sketchy review far from attempts to cover the subject of "Medical Genius and Contemporary Criticism." It pretends to be only a faltering and, I fear, rambling introduction to a lengthy theme. It will have served its purpose however, if it has drawn our attention to an important aspect of the study of medical history. Really the best way to see a man is in the light of his time and generation. We are perhaps too apt to see the genius of history judged only by the standards of another time, the critics of another generation; to see back through the mists of time only the rugged peaks thrust above the fog; to escape the broad view of the barren plains and green foothills from which they rise. The man of genius, seen in his true perspective, appears indeed grander than ever.

Editorials

THE FOURTEENTH ANNUAL MEETING

The Fourteenth Annual Meeting has now become a matter of historical interest for the College, and very pleasant history at that; for it was a complete success in every way. With an attendance registering thirteen hundred it proved to be very little short of the Boston meeting; and this, considering the location and the season, speaks volumes for the intrinsic drawing value of these clinical sessions of the College. The program proved to be an unusually interesting one, quite the best one the College has ever had, and there were only one or two failures in attendance on the part of the speakers advertised. A large audience was present at all of the sessions, and listened with evident appreciation and interest. The first papers were somewhat marred by the inadequacy of the lantern service, which was promptly remedied, so that no further trouble was experienced to the end of the session. The voice-amplifiers worked unusually satisfactorily, indeed, and were about as perfect as such things can be, at this stage of their development. It must be said, however, that their use certainly makes of the speaker more or less an automatic machine, for the necessity of restricted movement in speaking directly into the microphone certainly cramps the individual style and spontaneity in address, which, after all, constitute the things one wishes most to see in any public speaker. It becomes a question, whether the meetings that require the use of a large audience hall, with the necessity of using loud speakers, are not undesirable for this reason. Perhaps, as the College increases in size, the use of smaller lecture rooms with smaller sections, may offer the solution to this problem. Much praise was heard of the care with which the clinics had been prepared, and of the choice of material used in them. The exhibit was a great success, and its location in relation to the general meetings most advantageous, both for the exhibitor and the visitor. The Minneapolis men, and particularly Dr. Marx White, upon whom personally so much of the responsibility devolved, are to be sincerely congratulated for the great success of this meeting. Taken all in all, it led all of those that have preceded it, and establishes a new standard for those to follow.

THE APPARENT INCREASE IN THE INCIDENCE OF SYPHILITIC AORTITIS.

During the last several years there have appeared in the German literature various articles suggesting that under the modern arsenical treatment of syphilis there is actually taking place an *increasing* and *earlier incidence* of the so-called metaluetic

processes, such as leucoderma, aortitis, tabes and progressive paralysis, while on the other hand the tertiary skin lesions are less frequently encountered. The clinical face of syphilis seems to have essentially altered. Wilmans first called attention to the apparent increase in paresis and tabes; and although his conclusions have been confirmed by numerous syphilologists, they have been contradicted by nearly as many others. Langer* has had an experience similar to that of Wilmans. While seeing many cases of primary syphilis, he has been struck by the fact that he has been seeing relatively few typical cases of secondary lues, which are being replaced by atypical, severe or malignant forms of syphilis. Leucoderma has become significantly more common, and even more marked has been the increase in cases of neurosyphilis, partly in the form of the so-called neurorecidive, partly as brain syphilis, paresis and tabes. On the other hand bone syphilis and gummatous organ-lues formerly so frequent have almost vanished out of the clinical picture. Further, there appears to be an increase in those cases resistant to therapy, according to reports by Jessner, Langer, Silberstein and others. It has become significant and of great practical value to check up these clinical impressions with the autopsy findings of the last decade in order to determine whether a pathologic-anatomic foundation exists for this apparent change in the clinical picture of syphilis. Langer analyzed the autopsy material at the Rudolf-Virchow Krankenhaus, from the year 1905 to 1925; the number of autopsies occurring during this time being 23,015. Luetic stigmata were found in 1,268 of these, about 5.5 per cent. These stigmata were divided as to sex, 781 males and 487 females; 1.6 as many in the males as in the females. The highest incidence percentage of syphilitic stigmata occurred in 1919, when it rose to 9.07 per cent. The percentage relationship of aortitis to the total number of autopsies rose from 1.34 in 1906 to 3.69 per cent in 1925; but on the other hand the percentage relationship of aortitis to the syphilis-autopsies rose from 33.3 in 1906 to 83.87 in 1925, an increase of 2.5 fold, and of 2.7 fold for the total number of autopsies. Such an increase in the incidence of aortitis had been noted also by Jungmann and Hall. A separation of the two decades into 1906-1915 and 1916-1925 shows that the greater percentual increase of syphilis is in the second decade. Langer's table showing the ages of the patients showing syphilitic aortitis indicates that the life limit of the syphilitic has become shortened, confirming a previous observation by Melchior. The latter observer found in an observation of 358 cases of acquired syphilis a decrease of the life limit as compared to that of non-syphilitic cases. While among the syphilitics between the 30 and 60th years 65.4 per cent died, the percentage of deaths in the non-syphilitic cases for the same period was only 46 per cent. In Langer's material the peak of deaths in males, before and after 1915, was between 51-55 years; while in females before 1915 the peak was be-

*Langer, E.: Münch. Med. Wochenschr., October, 1926, p. 1782.

tween 51-55 years, after 1915 it had sunk to 46-50 years. Langer further compares the incidence of aortitis with other luetic lesions of the liver, kidneys, respiratory organs, bones and genital organs. The organ most frequently affected, next to the aorta, was the liver. Before 1915 it was involved in 15.26 per cent of cases; after 1915 in only 8.46 per cent, a decline of 1.8 fold. Also the other organs showed after 1915 a drop in the incidence of luetic lesions. After 1915 the syphilitic lesions in other organs were associated usually with aortitis; before 1915 the great majority of such organ lesions occurred without aortitis. This confirms the observations made by Gürich to the effect that with the increase of aortitis, as well as of tabes and paresis, luetic disease of the other organs has sharply diminished in frequency of occurrence, and that the liver is most frequently involved next to the aorta, although in a much less percentage as compared to the aorta. Langer, therefore, argues with Gürich, Jungmann. Hall and other writers that in the course of the last two decades that aortic syphilis has greatly increased. With this view E. Fraenkel is in accord, and has advanced the question as to whether the increase in aortic syphilis may not be due to present day methods of therapy. On the other hand many clinical observers, Buschke, Finger, Fischer and others, on the ground of their experience with a large mass of clinical material have repeatedly advanced the view that the clinical picture of syphilis has undergone a great change, and that syphilis has wandered from the skin, and is now affecting the nerves and nervous system. The comprehensive statistics founded upon a large material by Buschke and Schlarz confirm this view. We see fewer skin recidives than formerly, but so many more recidives in nervous and vascular systems. In this connection the findings of Heller in regard to aneurysms are interesting. In the years 1859-1870 there were 4.3 per cent aneurysms as against 19.2 per cent in the years 1910-1914, that is, the number of aneurysms increased in 1910-1914 more than four fold. From the psychiatric side the increase in the incidence of aneurysm has been confirmed. Coenen, Frisch and Loewenberg state that aortitis occurs in 39 per cent of cases of paresis and 33 per cent of cases of tabes. Copolla found involvement of the aorta in 86.93 per cent of cases of paralysis and tabes. Coenen made the observation that involvement of the aorta in tabes and paresis had risen from 2.2 per cent in the years 1908-1914 to 4.29 per cent in the years 1919-1925, almost a doubled incidence. On the other hand almost all clinicians have noted the decrease in tertiary skin lues. While the elder Glueck in the years 1898-1902 saw tertiary lues in 23 per cent of 15,064 syphilitics, the younger Glueck in the years 1913-1922 saw tertiary lues in only 2.1 per cent of 2,377 syphilitics. Formerly aortitis was very rare in Morocco, aortic aneurysm being unknown; but Durop and Salle have recently reported two cases of this condition there. Jungmann and Hall have attempted to show the relationship of the increase of aortitis to constitutional factors, and affirm that men of pyknic habitus

show aortic lues, as well as paresis, while the tabetics are asthenics in about 50 per cent of cases. While these observations are interesting they throw no light upon the increase of late syphilitic lesions in aorta and central nervous system. It will be well to bear in mind the warnings of Buschke made at the beginning of the salvarsan era of therapy; apparently many of them have been fulfilled. Not only have paralysis and tabes increased, according to Wilmans, but aortic syphilis has increased about three fold. Wilmans holds that the modern antisyphilitic treatment is indeed the cause of the change in the clinical picture of syphilis, in that it produces in the affected individual a shortening of the interval between the infection and the first clinical symptoms. Jungmann and Hall show in their arbeit that in untreated cases an average of 23.4 years occurs before the advent of syphilitic organic disease; in insufficiently treated cases an average of 22.1 years; while in fully treated cases an average of 15.0 years occurs. The clinical observations of Jungmann and Hall appear to show that the modern therapy of syphilis appears to shorten the interval between infection and the first appearance of aortic lues, as also of central nervous system lues. What the modern therapy of syphilis has accomplished would appear to be the prompt disappearance of the skin lesions, and the greater rarity of bone and gummatous organ-lesions. When we compare the importance of a gumma of the skin, bone or liver with the much more important syphilis of the aorta and central nervous system, the former is usually easily controlled by simple medication, but the patient with aortitis, paresis or tabes in spite of salvarsan therapy, in spite of malaria therapy, or other fever treatment, will still be with us as a spectre of the disease. Langer closes his paper with a plea for a mort rational therapy of syphilis—not that which will be the most intensive spirochaeticidal agent, but that which will least disturb the immunity processes of the body. He believes in the mildest treatment possible, which will aid and support the body in its defensive processes.

Abstracts

The Effect of a Suprarenal Extract for Malignant Growth. By WALTER B. COFFEY and JOHN D. HUMBER (J. A. M. A. Feb. 1, 1930, p. 359).

In a report made to the San Francisco County Pathological Society, January 6, these authors pointed out that their experimental work with endocrine extracts began in 1925, in the attempt to find a vasodilator and a stabilizer of tissue growth. After many failures, an extract of suprarenal cortex from sheep was made which reduced blood pressure when injected subcutaneously. Further development of the work demonstrated that this extract was a stabilizer of growth. A few patients with high blood pressure together with a malignant condition had under treatment a lowering of blood pressure from 240 to 150, together with a sloughing of the malignant tissue and subsequent disappearance of the growth. Later, they injected the extract only in patients with inoperable malignant growth, in the possibility of obtaining autopsies. One patient who had an embryonal carcinoma of the testes which could not be completely removed, was given the first injection, August 22, 1927, and is now without any evidence of neoplasm. Another patient with inoperable carcinoma of the rectum and complete obstruction was referred for colostomy, and was given a first injection, Sept. 1, 1929. At present this patient is without any evidence of tumor and so far has had no ill effects from the injections, and has apparently recovered. Within from 24-48 hours after the first dose, the tumor masses begin to soften, then liquefy, and within 10 days begin to slough. When the masses are favorably located, many have begun to slough within 48 hours. Although their series to date is small, they have had an opportunity to study the changes in the tissues of patients who died. The tissues are studied by Dr. A. M. Moody. The essential changes are necrosis of tumor cells which cannot at present be differentiated from that occurring naturally in malignant tumors. In one case of primary carcinoma of the kidney, with metastases in the lungs, about the necrotic secondary tumor nodules, there was marked vascularization. One patient who had received injections for two and a half months prior to death, and who died from renal insufficiency as the result of bilateral ureteral obstruction, had atrophic suprarenals, measuring only 3 mm. in thickness. The patient had a primary carcinoma of the cervix, which during the course of the injections had sloughed away. No secondary growths beyond the uterus and bladder were present. The writers emphasize the fact that their work to date has been purely experimental. Softening with liquefaction has occurred in all tumors thus far studied. These tumors except one, were all carcinomas of varying types; the one exception was a spindle cell sarcoma. They wish to impress upon the medical profession the fact that the work to date, which they style "quite promising" is still in the experimental stage, and therefore decidedly inconclusive.

An Interpretation of Malignant Growth Based on the Chemistry of Cell Division. By FREDERICK S. HAMMETT (Arch. of Pathol., October, 1929, p. 575).

Proliferation of cells is the common defining characteristic of all malignant growth. It follows then that the problem of malignancy centers itself primarily on the processes of cell reproduction. The question of inciting agents is secondary, since all these produce but one biologic reaction, namely, cell proliferation. Once the chain of reactions leading to increase in cell number has been set off in a receptive field, further development depends on the intrinsic biologic characteristics of the tissue in which the growth is taking place, regardless of the

nature of the agent which upsets the previously existing equilibrium. It is clear that the most logical way to approach the problem is through a study of the chemical processes specified for growth by increase in cell number. The first step was a description of the experimental work leading to a demonstration that the sulphydril group is the essential stimulus to multiplication of cells in healthy material. Direct transference of this observation to tumor tissue is allowable on the basis of Baker's report that glutathione, a sulphydril-containing compound is stimulative of a proliferation of cells in tissue cultures of sarcomatous fibroblasts. The next step was an examination of the available reports with respect to sulphur metabolism in general and sulphydril in particular in tumor-bearing persons and tumor tissue. From this, it was seen that the correlative data consistently support the idea of an inter-relationship between sulphydril and malignancy. The third step was an examination of the etiologic concepts of malignancy for the purpose of seeing whether or not they could be lined up on a common basis. From the known facts the thesis was developed that malignancy, in general, is a product of a combination and constitutional and acquired factors. An analysis of these showed that their influence is interpretable in terms of sulphydril. The chief manifestations of malignancy were also tested against this concept and found to be sustaining thereof. From all this the generalization has developed that the potentiality for malignancy lies in the hereditary determination of lines of cells retaining the embryonic characteristics of a heightened sensitivity to the essential stimulus to cell-proliferation, sulphydril, and that the development of malignancy depends on the presentation to the potentially tumor-producing cells of an adequate concentration of this chemical group. The author is willing to admit that this interpretation is possibly not the last word in the apparently complex problem of malignant disease. On the other hand, it does suffice to bring some order out of a previously existing chaos. Its validity, of course, rests on the soundness of the biologic principles involved.

The Significance of Balint's Phenomenon in Ulcer Patients. By S. A. Westra (Klin. Wschnschr., Sept., 1929, p. 1808).

In 1926 and 1927 Balint published an article and monograph in which he advanced the view that patients with gastric and duodenal ulcers have a more marked acid reaction in their tissues than normal individuals. Since this view was widely received and became the basis for various methods of treatment, Westra considered it advisable to subject the data on which this hypothesis was based to further critical experimentation. Balint injected intravenously 20 ccm. of an 8% sodium bicarbonate solution and estimated the pH and the titration-acidity in the urine for two hours preceding and two hours following the infusion, in fasting patients. It showed then that the urine became more alkaline, but that the difference in the ulcer-patients is much less than in the case of the control patients. Among the ulcer patients there were some in whom after the infusion of carbonate there was no increase of the urine alkalinity. This is the Balint phenomenon and Balint explained it as due to a bicarbonate retention on the part of the tissue, which would indicate an acid reaction in the tissue. On the grounds of his experimental work Westra concludes that the occurrence of Balint's phenomenon in individual ulcer cases is confirmed. It depends however upon changes of acidity in the urine and not upon a more rapid disappearance of the infused alkali from the blood. Bicarbonate infusions produce no alkalinity of the tissues; but through their influence on the autonomous nervous system produce a stimulation of the vagus. The Balint hypothesis of a tissue-acidity in ulcer patients is not confirmed. The Balint phenomenon finds a satisfactory explanation in the vagotonus of the ulcer patient, and there is no ground for the assumption of a theory of tissue acidosis in addition to the vagotonus theory of ulcus ventriculi and duodeni.

The Kahn Precipitation Test in Infancy and in Early Childhood. By John Coffey and Katherine V. Kreidel (Amer. Jour. of Dis. of Child, December, 1929, p. 1206).

Comparisons of the standard Noguchi Wassermann modification with the standard

Kahn test were carried out on 1,185 infants and young children under investigation for syphilis, 43 patients under treatment for syphilis and 315 mothers of patients in the aforementioned groups. The results of this study showed that the Kahn test is a highly sensitive and highly specific serologic test in infancy and early childhood. The reaction closely parallels the Wassermann reaction, but is not identical with it. Positive Wassermann reactions are more easily reversed by antisyphilitic therapy than are positive Kahn reactions. The Kahn test is considerably more sensitive than the Wassermann test in mothers of syphilitic offspring. It is highly specific in mothers of non-syphilitic offspring and equals the Wassermann test in this regard. The Kahn test has decided advantages in simplicity as a laboratory procedure. The Kahn test performed alone would have given slightly more reliable information than the Wassermann test performed alone on this group of patients. The performance of both complement fixation and precipitation tests simultaneously on identical serums gives more information than either test alone and affords a dual control in serologic diagnosis, which seems desirable.

The Importance of Indicanuria, Stool Fat and Schmidt Fermentation Test in the Practice of Pediatrics. By R. G. Freeman, E. G. Miller, and R. G. Freeman, Jr. (Arch. of Ped., May, 1929, p. 269).

In cases of digestive disturbance in children it is desirable to obtain all possible information regarding the cause, and much knowledge regarding the sort and amount of food that an individual child can care for, can be obtained by examination of his urine and feces. For a number of years tests for indican in the urine, chemical analysis of stools for fat and a Schmidt fermentation test have been carried out as routine tests in practice, and it has been possible to make satisfactory adjustments of the diet of children with malnutrition and digestive symptoms on the basis of the findings of those tests. Obermayer's method is used for the test for indican in the urine. The fecal fat was determined by the method of Freeman and Miller. As a result of this study it was found that the tests used for indican, fecal fat and fermentation are sufficiently accurate and simple to be used as office routine in all cases in which symptoms of digestive disturbance in children are evident. These tests also indicate the character of the food that is the source of trouble, and also serve as an excellent control of the results of treatment. This study indicates that normal children show infrequent indicanuria, fecal fat under 6.5 per cent, and fermentation tests producing less than 7 cc.; while children with symptoms of abnormal alimentation practically always show either an indicanuria, an excess of stool fat, or fermentation by the Schmidt test, and in some cases all three of these. 80 per cent of the examinations in children with symptoms, in office practice, showed carbohydrate excess; 60 per cent protein excess; and 33 per cent fat excess. Dietary restriction of these cases, in accordance with our laboratory findings (if carried out conscientiously by the parents or others in charge of the children) usually result in improvement in the condition of the children, and in a reduction of the abnormalities in the urine and feces. The occurrence of indican in so-called normal children is considerably less than in those examined for symptoms of indigestion. Although there is no proof, the authors feel strongly that the incidence of the indican in the normal group was due to transient digestive upsets.

Silicosis Among Rock Drillers, Blasters and Excavators in New York City. By Adelaide Ross Smith (Jour. of Indust. Hygiene, Feb., 1929).

As an occupational disease, silicosis has a long history, but it is only comparatively recently, that is to say, within the past twenty-five years, that it has received attention. In the United States the first studies of silicosis were made among the zinc miners of Missouri by Lanza and Childs, in 1917. The present study was made of 208 rock drillers, blasters and excavators in New York City for the purpose of determining the incidence of silicosis among them. Silicosis was found to be present in 118, or in 57 per cent of the men examined. Twenty-three per cent of the men examined showed radiographic evidence of anteprimary sili-

cosis; 19 per cent of first stage silicosis; 7 per cent of second stage silicosis; and 8 per cent of third stage silicosis. Blasters, rock drillers and excavators were affected by the disease in frequency and in severity in the order named. Second and third stage silicosis occurred four times as frequently among those who had done under-ground work, as among those who had done only open excavating. The incidence of silicosis among men who had worked only in New York City was slightly higher than among those who had worked elsewhere as well. Ante-primary silicosis was found to be present in conspicuous proportions after five years' exposure to rock dust; first stage silicosis after ten years' exposure; and second and third stage silicosis after twenty years' exposure. Second and third stage silicosis was associated to a noticeable degree with a past history of pleurisy and pneumonia. Dyspnea and expectoration were the only symptoms found to be significantly associated with the disease in this study. Lung signs were in general inclusive, although râles and diminished resonance and breath sounds were found most frequently among those showing silicosis in the second and third stages. Tuberculous lesions revealed by roentgen examination, including both those considered active, and those believed to be probably healed, occurred in nineteen cases, or 9 per cent of the total number. The incidence of all tuberculous lesions was aproximately three times as high in the group of cases showing second and third stage silicosis as in any of the other groups. The author concludes that silicosis constitutes a serious health hazard to rock drillers, blasters, and excavators in New York City.

Reviews

Grenz Ray Therapy. By GUSTAV BUCKY, M.D., New York, with contributions by DR. OTTO GLASSER, Cleveland, and DR. OLGA BECKER-MANHEIMER, Hamburg. Translated by WALTER JAMES HIGHMAN, M.D., New York. 170 pages, 40 illustrations in the text. The McMillan Company, New York, 1929. Price in cloth, $3.50.

Grenz rays are soft Roentgen rays having wave lengths of from 1-3 Angström units and are produced in lithium glass x-ray tubes with voltages from 4-10 kilovolts. They are called Grenz or border-line rays to express the fact that they border on the utilizable Roentgen wave length. This book discusses the exact position of the Grenz ray spectrum in the general spectrum of radiation, and describes the high tension apparatus, and tubes for their production. Grenz rays are so soft that they are absorbed in air to considerable degree. Therefore, only direct determinations of the radiation quality and quantity at the site of application are found to be satisfactory. The absorption of Grenz rays in aluminum foil of 0.0125 mm. thickness has been determined for different conditions of radiation and the half-value layers of this radiations are found to be between 0.007 and 0.04 mm. of aluminum. The effective wave lengths are found to lie between 1 and 3 Angström units. Data for translating half-value layers of aluminum into half-value layers of air, water, muscle, cutis vera, epidermis and subcutaneous tissue are given. The method of standardizing the intensity of Grenz rays in R units per minute is described. A description is given of a small, 1 cc., ionization chamber of goldbeater's skin which is practical for dosage measurements in Grenz rays and which can be connected to any ionization Roentgen dosimeter, and shows no appreciable absorption and can be used to measure the radiation intensity of Grenz rays independent of the wave length down to rays produced at 5 kilovolts. The threshold erythema dose for Grenz rays seems to be in the neighborhood of 300 R units. A chapter is given to anatomic and biologic considerations of the effects of Grenz rays. No arbitrary conclusions as to biological differences between the effect of Grenz and Roentgen rays are yet warranted. The technique of Grenz rays therapy is described, and a chapter is given on the clinical symptoms in Grenz ray therapy. The clinical effects on the skin after exposure to Grenz rays are characteristic and differ materially from those encountered after the Roentgen ray; some resemble more those produced by Roentgen rays, while others resemble those seen after exposure to ultraviolet rays. The author considers the most important effects of Grenz rays to be their influence on endocrine secretion, their antispastic and stimulating effects. Grenz ray treatment of skin and internal conditions never produces by-effects as Roentgen rays do. He further claims that expert application of Grenz rays has not hitherto produced sequelae in a single instance, and that the danger coefficient of Grenz rays is not to be compared with that of the Roentgen ray. If future experimental work should confirm this, it is possible that the Grenz ray may come to replace the Roentgen ray in a large proportion of cases. The whole matter, however, is still in an early experimental stage, and no positive conclusions are as yet warranted.

Practical Massage and Corrective Exercises. With Applied Anatomy. By HARTVIG NISSEN, Late President of Posse Normal School of Gymnastics; For Twenty-four Years Lecturer and Instructor of Massage and Swedish Gymnastics at Harvard University Summer School, etc. Fifth Edition, Revised and Enlarged by HARRY NISSEN, President, Posse-Nissen School

of Physical Education, Boston, Mass. 271 pages, 72 original half-tone and line engravings. F. A. Davis Company, Philadelphia, 1929. Price in cloth, $2.50.

This little book has been used as a textbook at the Posse-Nissen School of Physical Education for the past twelve years. It has now been carefully revised in order that certain parts may be made clearer and more helpful through the addition of new material, new illustrations and lists of exercises. It is divided into three parts for ease of study—First, the different manipulations and their effects; Second, applied anatomy and corrective exercises with various lists of exercises; Third, treatment of various diseases and injuries, including a discussion on flat foot. The theory and art of massage and corrective exercises are concisely and clearly described and explained, and illustrated by numerous well-chosen illustrations. It contains very useful knowledge for the practitioner, who can utilize in his daily practice the methods herein described with great practical value to his patients, as, for example, in the indicated treatment for lumbago, a condition which every physician is frequently called upon to treat.

Materia Medica and Therapeutics. Including Pharmacy and Pharmacology. By Reynold Webb Wilcox, M.A., M.D., LL.D., D.C.L. Twelfth Edition, Revised in accordance with the United States Pharmacopoeia X and the National Formulary V. With an Index of Symptoms and Diseases. 690 pages. P. Blakiston's Son and Company, Inc., Philadelphia, 1929. Price in cloth, $5.00 net.

The appearance of the United States Pharmacopoeia X has necessitated a rewriting of the section devoted to Pharmacy and Materia Medica and a thorough revision of this volume, which treats of the official drugs and preparations only, with such incidental reference to non-official as their usage warrants. Every effort has been made toward condensation, as far as compatible with clearness. In order that the subjects might be presented in one volume and all repetitions avoided, cross references have been inserted, and an exhaustive index added for the convenience of physicians who use this book as a reference. The many advances have necessitated the division of the work into two parts, the first being devoted to Materia Medica and Pharmacy, in which full attention is given to pharmaceutical processes, to the various kinds of preparations, with their dosage and to the art of prescribing; after which the description of remedies is taken up in detail. These are divided into two sections: the Inorganic and the Organic Materia Medica. The general classification adopted is one based on the grouping of the articles according to the chemical or physiological divisions to which each belongs. The course of instruction in Materia Medica should include the performance of the simpler pharmaceutical operations, demonstration of the drugs and their preparations, and practice in prescription writing. It is believed that it is best to learn first the nature of the stubstance, and then its action and uses in medicine. In the second part which deals with Pharmacology and Therapeutics, the classification employed is based on the particular physiological system upon which the various agents principally act. There is a complete presentation of the official remedies and very elaborate descriptions of their pharmacological action and therapeutic uses. In these descriptions the effort has been made to present the latest views of the highest authorities in these departments, and to render the book as practically useful as possible by full details regarding treatment which have been found to be valuable in actual practice. In the National Formulary are contained many preparations which have the sanction of general use. These have been freely commented upon because they are efficient and agreeable for prescribing; and through their use the resources of the practitioner will be greatly enlarged. It is believed that this volume offers to the medical student and to the practitioner, a very complete presentation of the resources of Materia Medica, of their Pharmacology and their application in Therapeutics. A critical survey of the contents confirms the author's aims and belief; and the volume may be recommended as a well-organized and condensed work, covering the ground sufficiently thoroughly, for the purposes indicated.

Hypertension and Nephritis. By ARTHUR M. FISHBERG, M.D., Adjunct Attending Physician to Mount Sinai and Montefiore Hospitals, New York City. 566 pages, 33 engravings and 1 colored plate. Lea and Febiger, Philadelphia, 1930. Price, $6.50 net.

The purpose of this work is to depict our present knowledge of the heterogeneous group of diseases traditionally included in the concept of Bright's disease. It is written primarily from the point of view of the actual practice of medicine, and aims to summarize for the practitioner the information that practice, clinic and laboratory have yielded regarding the hypertensive and renal diseases. In the century that has elapsed since the classical memoir of Bright, hypertension and nephritis have occupied focal points of medical interest; and in recent years they have been more than ever in the foreground. The introduction of the sphygmomanometer into general practice has revealed the great frequency of essential hypertension, and these is good reason to believe that its incidence is increasing. Recent development of various chemical and physico-chemical methods of investigation renders feasible the fruitful study of many fundamental problems presented by the renal and hypertension diseases which were previously not open to attack. Understanding of the hyptertensive and renal diseases has been greatly advanced by the correlation of laboratory investigations with bedside and postmortem studies. Progress has not been solely along theoretical lines, but the actual practice of diagnosis, prognosis and treatment has been notably furthered. This work is written primarily for the general practitioner whose laboratory facilities are usually limited. Therefore, diagnosis by clinical methods has been stressed. Particular attention has been given to symptomatology, and understanding of which is essential to accurate diagnosis. Relatively simple dietetic measures are recommended in the section on treatment, dietaries which can be supplied in the home of the patient under the direction of the family physician. Throughout the book the author has kept the general practitioner in mind, recommending such tests and other procedures as can be easily carried out by him. For example, the simple specific gravity test is, in the author's opinion, the best method at present available for studying the functional capacity of the kidneys, and a simple technique is given for this test which is well adapted to general practice. It is emphasized that study of the blood chemistry is necessary in only a minority of patients with high blood pressure, and that when it is desirable as much information concerning the excretory capacity of the kidneys is furnished by the determination of either the urea or the nonprotein nitrogen content of the blood as by more detailed and involved studies. The table of contents shows a thorough grasp of the subject and the comprehensive nature of the ground covered in this book. The material is clearly presented, and the ilustrations are very fair. Altogether the work forms a very satisfactory presentation of the subjects of hypertension, nephrosis and nephritis.

The Blood Picture and Its Clinical Significance (Including Tropical Diseases). A Guidebook on the Microscopy of Blood. By PROFESSOR DR. VICTOR SCHILLING, Physician-in-Chief, The First Medical University Clinic, Charité, Berlin. Translated and Edited by R. B. H. GRADVOHL, M.D., Director of the Pasteur Institute of St. Louis and the Gradvohl School of Laboratory Technique, St. Louis, Mo. Seventh and Eighth Revised Editions. 408 pages, 44 illustrations and 4 color plates. The C. V. Mosby Company, St. Louis, 1929. Price in cloth, $10.00.

This book is based upon the author's own practical experience. In its first edition, in 1912, it appealed primarily to physicians practicing in the tropics. In later editions it was enlarged and supplemented by numerous practical examples from the whole field of medicine. An understanding of the blood picture should no longer be a rare art, but rather a routine procedure, familiar to all physicians. It is not intended to replace the well-known manuals of hematology, but rather to supplement them, by simplifying existing methods, to the exclusion of all superfluous material, and to assist in our understanding of the morphology of the

blood picture. In this work the blood picture is purposely put in the foreground, so that its symptomatic, prognostic or diagnostic value for known and unknown diseases may be tested. In the author's opinion, the importance of the blood picture has materially advanced, sufficiently to take rank with the fundamental bedside methods of examinaiton, with pulse records, fever curves, urine examination, auscultation and percussion. It has become a necessary part of a medical examination in all doubtful or difficult cases. In this edition there have been added to the sections on blood typing, the "Guttadiaphot method," a discussion of Arneth's new book on "Qualitative Blood Theory," and the Bartonella group and erythrocontes have also been added. The paragraphs on the sedimentation reaction have been enlarged. Changes in the protoplasm of leucocytes has also been rewritten. Liver therapy in pernicious anemia, and a few rare blood pictures, such as malignant neutropenia, aleukia, etc., have also been added. Otherwise the fundamental features of the book remain practically the same as in the first edition. It is a work of value for the laboratory worker in internal medicine when used in connection with other manuals of hematology.

Old Age, The Major Involution. The Physiology and Pathology of the Aging Process. By ALDRED SCOTT WARTHIN, Ph.D., M.D., LL.D., Professor of Pathology and Director of the Pathological Laboratories in the University of Michigan, Ann Arbor. With 199 pages and 29 illustrations. Paul B. Hoeber, Inc., New York, 1929. Price in cloth, $3.00. Special limited edition, $12.50.

"I have read the book from cover to cover. I have not only been interested. I have profited. You definitely establish your thesis. I do not see how any one with a knowledge of science, and especially with a knowledge of the human body can deny your major statements. You speak with such evident first-hand knowledge, with so much reserve, yet with such positiveness; you marshall your proof in such an orderly way, as to be convincing. Moreover, you do this with such clarity, with such excellent choice and arrangement of words that your writing has a grace and charm—a style men call it—that it enables one to read with pleasure. I congratulate you on the book. I only wish I had the knowledge, ability, time and urge to write something as good. I have not been depressed by your dwelling upon the inevitableness of old age. Perhaps this is because I have long viewed age in that light. I have not been depressed even when I read your catalogue of the features of fully developed senility. You must know how heartily I endorse your praise of gardening as an avocation. Practiced in an amateurish and somewhat irregular way, it has been of inestimable help in keeping me physically fit and in preserving—so it seems to me—an optimistic view of life. Though I don't understand the philosophy and full meaning of life, I have learned many things concerning it by communion with plants and the soil. May I venture to give two quotations that I enjoy repeating to myself. The first is from Kipling:—

"The cure for this ill is not to sit still
And frowst with a book by the fire;
But to take a large hoe, and a shovel also,
And dig till you gently perspire."

The other is the last sentence of Voltaire's Candide:—

"All that is very well," answered Candide, "but let us cultivate our garden."

There is comfort in having scientific assurance that the aging process in the brain, as shown by mental and spiritual functions, is not always as advanced as that in some other organs of the body. I am hoping that when I am older in years and perhaps badly shattered in body, as I sit comfortably slippered in a warm corner of the fireside with a good book, and a few tried friends who endure a not too personally reminiscent garrulousness because it is mixed with serenity and a grain of wisdom that has come from experience and a sane view of life, I am hoping that then it may be said to me as the Italian proverb has it:—"Vale piri un vecchio in un cañto che un giovane in un campo"—An old man in a corner is worth more than a young man in the field. And my dear Warthin, may I wish the same serene old age for you!"

James B. Herrick.

(Happy, indeed, is he who receives such a letter.—A. S. W.)

College News Notes

At the General Business Meeting of the American College of Physicians held at Minneapolis, February 13, in connection with the Fourteenth Annual Clinical Session, the following Officers, Regents and Governors were elected:

OFFICERS

President.....Sydney R. Miller, Baltimore, Md.
President-Elect.....S. Marx White, Minneapolis, Minn.
First Vice President.....Aldred Scott Warthin, Ann Arbor, Mich.
Second Vice President.....F. M. Pottenger, Monrovia, Calif.

REGENTS

Term Expiring 1931

James B. Herrick.....Chicago, Ill.

Term Expiring 1932

Logan Clendening.....Kansas City, Mo.

Term Expiring 1933

James R. Arneill.....Denver, Colo.
Walter L. Bierring.....Des Moines, Iowa
George E. Brown.....Rochester, Minn.
John H. Musser.....New Orleans, La.
O. H. Perry Pepper.....Philadelphia, Pa.

BOARD OF GOVERNORS

Term Expiring 1933

Wm. H. Deaderick.....Hot Springs, Ark.
Hans Lisser.....San Francisco, Calif. (Northern)
Tom Bentley Throckmorton.....Des Moines, Iowa
Randolph Lyons.....New Orleans, La.
Charles G. Jennings.....Detroit, Mich.
Edward L. Tuohy.....Duluth, Minn.
A. Comingo Griffith.....Kansas City, Mo.
Edward O. Otis.....Exeter, N. H.
W. Blair Stewart.....Atlantic City, N. J.
Charles H. Cocke.....Asheville, N. C.
Julius O. Arnson.....Bismarck, N. D.
Fred J. Farnell.....Providence, R. I.
Robert Wilson, Jr.....Charleston, S. C.
Clarence H. Beecher.....Burlington, Vt.
J. M. Hutcheson.....Richmond, Va.
Frederick Epplen.....Seattle, Wash.
John N. Simpson.....Morgantown, W. Va.
D. Sclater Lewis.....Montreal, Que.

At the organization of the new Board of Governors on February 14, Dr. Charles G. Jennings, of Detroit, Mich., retired as Chairman of the Board. Dr. W. Blair Stewart, Atlantic City, N. J., was elected successor to Dr. Jennings, and thereby becomes a member ex officio of the Board of Regents.

At the meeting of the new Board of Regents on February 14, the following were elected members of the Executive Committee for 1930-31:

Sydney R. Miller.....Baltimore, Md.
Clement R. Jones.....Pittsburgh, Pa.
Jonathan C. Meakins.....Montreal, Que.
James H. Means.....Boston, Mass.
James Alex. Miller.....New York, N. Y.
George Morris Piersol.....Philadelphia, Pa.
Maurice C. Pincoffs.....Baltimore, Md.
Aldred Scott Warthin.....Ann Arbor, Mich.
S. Marx White.....Minneapolis, Minn.

The Board of Regents, in accordance with the provisions of the By-Laws, appointed Dr. George Morris Piersol, Philadelphia, Pa., Secretary-General, and Dr. Clement R. Jones, Pittsburgh, Pa., Treasurer for the year 1930-31.

At the 1930 Annual Convocation of the College at Minneapolis on February 12, the following physicians were regularly inducted to Fellowship. During the processional, the Officers, Regents and elected candidates marched to their places in the Auditorium. The candidates were presented by Dr. George Morris Piersol, Secretary-General of the College; after the administration of the Fellowship Pledge by Dr. F. M. Pottenger, Fellowships were conferred by Dr. John H. Musser, retiring President. The annual address of the President which will be printed later in this journal, was delivered by President Musser. Following adjournment, the newly inducted Fellows signed the official Roster and received their Certificates of membership. The entire Convocation Program was dignified and impressive.

F. Dennette Adams.....Boston, Mass.
Winthrop Adams.....Washington, D. C.
Thomas Addis.....San Francisco, Calif.
Frank Nathaniel Allan.....Rochester, Minn.
Olin Sudler Allen.....Wilmington, Del.
Harry L. Arnold.....Honolulu, Hawaii
J. Richards Aurelius.....St. Paul, Minn.
Samuel Ayres, Jr.....Los Angeles, Calif.
Henry T. Ballantine.....Muskogee, Okla.
Isabel Marion Balph.....Philadelphia, Pa.
Arlie Ray Barnes.....Rochester, Minn.
Frederick Rigby Barnes.....Fall River, Mass.
Harold Ludlow Barnes.....Brooklyn, N. Y.
Oscar B. Biern.....Huntington, W. Va.
Arthur L. Bloomfield.....San Francisco, Calif.
Andrew Bonthius.....Pasadena, Calif.
Milton C. Borman.....Montgomery, W. Va.
Joseph F. Bredeck.....St. Louis, Mo.
Francis G. Brigham.....Boston, Mass.
Charles L. Brown.....Ann Arbor, Mich.
James H. Brown.....Colorado Springs, Colo.
Trevor G. Browne.....Battle Creek, Mich.
William P. Buffman.....Providence, R. I.
James B. Bullitt.....Chapel Hill, N. C.

Frank Walton Burge.....Philadelphia, Pa.
Herbert Arthur Burns.....Ah-Gwah-Ching, Minn.
Edward Joseph Buxbaum.....New York, N. Y.
William W. Cadbury.....Canton, China
Edward Swazey Calderwood.....Boston, Mass.
John L. Calene.....Aberdeen, S. D.
Russell J. Callender.....Tucson, Ariz.
Joseph Almarin Capps.....Chicago, Ill.
James Bain Carey.....Minneapolis, Minn.
Claude E. Case.....Clifton Springs, N. Y.
Verne Caviness.....Raleigh, N. C.
Roger M. Choisser.....Washington, D. C.
Leo Gregory Christian.....Lansing, Mich.
Laurance James Clark.....Vicksburg, Miss.
Frank Clair Clifford.....Toledo, Ohio
Gerald M. Cline.....Bloomington, Ill.
Peter A. Colberg.....Worcester, Mass.
Dean Baldwin Cole.....Richmond, Va.
George Howell Coleman.....Chicago, Ill.
Mandred W. Comfort.....Rochester, Minn.
Edward Franklin Foster Copp.....La Jolla, Calif.
George W. Covey.....Lincoln, Nebr.
Sylvester D. Craig.....Winston-Salem, N. C.
Walter Stanley Curtis.....Boston, Mass.
Harold S. Davidson.....Atlantic City, N. J.
Foster L. Dennis.....Dodge City, Kansas
William Devitt.....Allenwood, Pa.
Goodwin A. Distler.....Woodhaven, L. I., N. Y.
Robert Kenneth Dixon.....Rochester, Minn.
Harold G. F. Edwards.....Shreveport, La.
Orville Edward Egbert.....El Paso, Texas
John Eiman.....Philadelphia, Pa.
Lewis W. Elias.....Asheville, N. C.
Charles A. Elliott.....Chicago, Ill.
Harry Smith Emery.....Portland, Maine
Edward J. Engberg.....St. Paul, Minn.
Harvey Milligan Ewing.....Newark, N. J.
James A. Evans.....La Crosse, Wis.
Samuel Maurice Feinberg.....Chicago, Ill.
Reuben Finkelstein.....Brooklyn, N. Y.
Philip W. Flagge.....High Point, N. C.
Benjamin B. Foster.....Portland, Maine
Maurice Fremont-Smith.....Boston, Mass.
Nelson Gapen.....Washington, D. C.
Edwin L. Gardner.....Minneapolis, Minn.
A. Morris Ginsberg.....Kansas City, Mo.
Alfred Goldman.....St. Louis, Mo.
Alfred Meyer Goltman.....Memphis, Tenn.
Edward Victor Goltz.....St. Paul, Minn.
Adrian H. Grigg.....Beckley, W. Va.
Samuel Faitoute Haines.....Rochester, Minn.
George W. Hall.....Chicago, Ill.

J. Edward Harbinson.....Woodland, Calif.
Charles Lydon Harrell.....Norfolk, Va.
Francis Edward Harrington.....Minneapolis, Minn.
DeForest R. Hastings.....Minneapolis, Minn.
Harold S. Hatch.....Indianapolis, Ind.
Harry Malcombe Hedge.....Chicago, Ill.
Will Delafield Hereford.....Huntington, W. Va.
Edgar Thomas Herrmann.....St. Paul, Minn.
George H. Hess.....Uniontown, Pa.
Frank C. Hodges.....Huntington, W. Va.
Frederic William Holcomb.....Kingston, N. Y.
Charles Edwin Homan, Jr.....Chattanooga, Tenn.
Bayard Taylor Horton.....Rochester, Minn.
James W. Hunter, Jr.....Norfolk, Va.
Howard M. Jamieson.....Decatur, Ill.
Sydney E. Johnson.....Louisville, Ky.
Walter Royle Johnson.....Rochester, Minn.
Sara Murray Jordan.....Boston, Mass.
Gordon Richard Kamman.....St. Paul, Minn.
Eliah Kaplan.....New Castle, Pa.
Karl E. Kassowitz.....Milwaukee, Wis.
Bayard G. Keeney.....Shelbyville, Ind.
Ernest Ellsworth Keet.....Jamaica, N. Y.
William John Kerr.....San Francisco, Calif.
Ray William Kissane.....Columbus, Ohio
Thurman D. Kitchin.....Wake Forest, N. C.
John R. Kleyla.....Omaha, Nebr.
Louis Leon Klostermyer.....Warsaw, N. Y.
David Nathaniel Kremer.....Philadelphia, Pa.
George H. Lathrope.....Newark, N. J.
Shailer Upton Lawton.....New York, N. Y.
William Harry Leake.....Los Angeles, Calif.
William Mathias LeFevre.....Muskegon, Mich.
David Stanley Likely.....New York, N. Y.
Salvatore Lojacono.....Marquette, Mich.
Chancel Ray Lounsberry.....San Diego, Calif.
Tom Lowry.....Oklahoma City, Okla.
Arthur E. Mahle.....Chicago, Ill.
Fergus O. Mahony.....El Dorado, Ark.
Thomas Meriwether Marks.....Lexington, Ky.
William Mason.....Fall River, Mass.
Peter Milton Mattill.....Oak Terrace, Minn.
Edgar Mayer.....Saranac Lake, N. Y.
Laurence H. Mayers.....Chicago, Ill.
William Sharp McCann.....Rochester, N. Y.
Daniel Michael McCarthy.....Brooklyn, N. Y.
Donald McCarthy.....Minneapolis, Minn.
Harry B. McCorkle.....Colorado Springs, Colo.
James J. McGuire.....Trenton, N. J.
Kent C. Melhorn.....Port au Prince, Haiti
George Adams Merrill.....Brooklyn, N. Y.
Joseph L. Miller.....Chicago, Ill.

F. Clifton Moor.....Tallahassee, Fla.
John William Moore.....Charleston, W. Va.
Garnett Nelson.....Richmond, Va.
Delbert Harry Nickson.....Seattle, Wash.
Johannes M. Nielsen.....Battle Creek, Mich.
Lillian L. Nye.....St. Paul, Minn.
Paul A. O'Leary.....Rochester, Minn.
Charles C. Orr.....Asheville, N. C.
Moses Paulson.....Baltimore, Md.
Warren F. Pearce.....Quincy, Ill.
Joseph Maxime Perret.....New Orleans, La.
Johannes F. Pessel.....Trenton, N. J.
Hugo O. Peterson.....Worcester, Mass.
Russell C. Pigford.....Tusa, Okla.
Carlos A. Pons.....Asbury Park, N. J.
William Branch Porter.....Richmond, Va.
Sidney A. Portis.....Chicago, Ill.
Ellen Culver Potter.....Trenton, N. J.
Benjamin Harrison Ragle.....Boston, Mass.
George W. Ramsey.....Washington, Pa.
Hans Reese.....Madison, Wis.
William Duncan Reid.....Boston, Mass.
Eugen G. Reinartz.....Dayton, Ohio
Wyman Richardson.....Boston, Mass.
Lester D. Riggs.....Rutland Heights, Mass.
Paul Henry Ringer.....Asheville, N. C.
Henry Lawrence Robertson.....Charleston, W. Va.
James E. Robinson.....Temple, Texas
Howard Root.....Brookline, Mass.
A. H. Ross.....Eugene, Oregon
John Carroll Ruddock.....Los Angeles, Calif.
Leo Victor Schneider.....State Sanatorium, Md.
Roscoe Lloyd Sensenich.....South Bend, Ind.
James B. Sidbury.....Wilmington, N. C.
Clarence E. Simonds.....Willimantic, Conn.
Harry M. Simpson.....Florence, Ala.
Dwight L. Sisco.....Boston, Mass.
Sidney A. Slater.....Worthington, Minn.
Harry LeRoy Smith.....Rochester, Minn.
Henry T. Smith.....McGehee, Ark.
Munford Smith.....Boston, Mass.
Sam Harrison Snider.....Kansas City, Mo.
Mary McIndo Spears.....Philadelphia, Pa.
Oliver H. Stansfield.....Worcester, Mass.
Charles William Stevenson.....Wichita Falls, Texas
Arthur George Sullivan.....Hot Springs National Park, Ark.
Mary Frances Sweet.....Decatur, Ga.
Ralph M. Tandowsky.....Salt Lake City, Utah
John C. Thompson.....Lincoln, Nebr.
Samuel E. Thompson.....Kerrville, Texas
John Thurston Thornton.....Wheeling, W. Va.
Charles Henry Turkington.....Litchfield, Conn.

Warren Taylor Vaughan.....Richmond, Va.
Italo Frederick Volini.....Chicago, Ill.
Henry S. Wagner.....Pocasset, Mass.
Mortimer Warren.....Portland, Maine
Earl C. Waterbury.....Newburgh, N. Y.
Charles Edward Watts.....Seattle, Wash.
William Frederick Wegge.....Milwaukee, Wis.
James Fisher Weir.....Rochester, Minn.
Sumner Merrill Wells, Jr.....Grand Rapids, Mich.
Oliver Clarence Wenger.....Hot Springs National Park, Ark.
Joel Jesse White.....Washington, D. C.
Paul Dudley White.....Boston, Mass.
Harrison A. Wigton.....Omaha, Nebr.
Otis Wildman.....Washington, D. C.
Sidney Dean Wilgus.....Rockford, Ill.
Fred Wooten Wilkerson.....Montgomery, Ala.
Robert A. C. Wollenberg.....Detroit, Mich.
George Barrow Worthington.....San Diego, Calif.
George A. Pemberton Wright.....Kingston, Jamaica, B. W. I.
John G. Young.....Dallas, Texas
John Peter Zohlen.....Sheboygan, Wis.

The following physicians were duly elected to Associateship at the Minneapolis Clinical Session on February 11.

Samuel Simon Altshuler.....Ann Arbor, Mich.
Arnold S. Anderson.....Minneapolis, Minn.
Henry E. Bibler.....Muncie, Ind.
Harold Vincent Bickmore.....Portland, Maine
James Raymond Boyd.....Brooklyn, N. Y.
Archibald Evans Cardle.....Minneapolis, Minn.
Austin Clifford Davis.....Rochester, Minn.
David Barden Davis.....Grand Rapids, Mich.
Harold Foster Dunlap.....Rochester, Minn.
Abram Wilbur Duryee.....New York, N. Y.
Jacob Feigenbaum.....Ann Arbor, Mich.
Ejvind Palmer K. Fenger.....Oak Terrace, Minn.
Ralph Lee Fisher.....Detroit, Mich.
Seymour Fiske.....New York, N. Y.
Wetherbee Fort.....Baltimore, Md.
Thomas Albert Foster.....Portland, Maine
Victor K. Funk.....Oak Terrace, Minn.
Francis Joseph Geraghty.....Baltimore, Md.
Samuel Goldberg.....Philadelphia, Pa.
Julius Gottlieb.....Lewiston, Maine
William Randolph Graham.....Richmond, Va.
Michael Robert Haley.....Dayton, Ohio
John Ralph Hamel.....Portland, Maine
John Richard Hamilton.....Nassawadox, Va.
Seale Harris, Jr.....Birmingham, Ala.
Arthur F. Heyl.....New Rochelle, N. Y.
Arthur M. Hoffman.....Los Angeles, Calif.
Archibald Leitch.....St. Paul, Minn.
Walter Eber Leonard.....Los Angeles, Calif.

Edgar Webb Loomis.....Dallas, Texas
Earle E. Mack.....Syracuse, N. Y.
Robert C. Maddox.....Rome, Ga.
Henry M. Margolis.....Rochester, Minn.
Alexis T. Mays.....Brooklyn, N. Y.
Ralph J. McMahon.....Union, N. Y.
Philip Marsden McNeill.....Oklahoma City, Okla.
George LeRoy Merkert.....Minneapolis, Minn.
Edwin Curtis Miller.....Worcester, Mass.
Frank B. Morrissey.....St. Paul, Minn.
Gilbert Seymour Osincup.....Orlando, Fla.
Wallace Taylor Partch.....Rochester, Minn.
Charles Kenneth Petter.....Oak Terrace, Minn.
John J. Pink.....Milwaukee, Wis.
Rudolph Virchow Powell.....St. Louis, Mo.
Alfred Hazen Price.....Detroit, Mich.
Wallace E. Prugh.....Dayton, Ohio
D. Schuyler Pulford.....Woodland, Calif.
Luney Varnon Ragsdale.....Bessemer, Ala.
Samuel S. Riven.....Ann Arbor, Mich.
Floyd Leslie Rogers.....Lincoln, Nebr.
Frank E. Sayers.....Terre Haute, Ind.
Frances H. Schlitz.....Wichita, Kansas
Earl Oriol Gregor Schmitt.....San Jose, Calif.
Edward William Schoenheit.....Asheville, N. C.
Robert James Snider.....Wheeling, W. Va.
Benjamin Bruce Souster.....St. Paul, Minn.
F. C. Svoboda.....San Diego, Calif.
Walter Clifford Swann.....Huntington, W. Va.
Edwin Chester Swift.....Jacksonville, Fla.
Joseph Gerard Terrence.....Brooklyn, N. Y.
Harold G. Trimble.....Oakland, Calif.
Henry Hubert Turner.....Oklahoma City, Okla.
Silas Willard Wallace.....Grosse Pointe, Mich.
Ernest S. Wegner.....Lincoln, Nebr.
William F. Williams.....Cumberland, Md.
Harry Hults Wilson.....Los Angeles, Calif.
Irving Sherwood Wright.....New York, N. Y.

THE AMERICAN COLLEGE OF PHYSICIANS
FINANCIAL STATEMENTS
for 1929

Summarizing the Financial Reports, which follow, it may be stated that gross income for the year ending December 31, 1929, amounted to $68,946.83, and that the net expenditures amounted to $47,584.44, leaving a balance of $21,362.39; $1,200 of which is added to the Endowment Fund and $20,162.39 added to the principal of the General Fund. During the year, the Endowment Fund, made up of Life Membership subscriptions, was increased from $4,100 to $5,300; and the General Fund increased from $40,461.68 to $60,624.07, making the total assets of the College as of December 31, 1929, $65,924.07.

The cost of conducting the Boston Clinical Session was $9,784.57, which was reduced through profits on the Commercial Exhibits, guest fees and a small Banquet balance by $6,119.64, or a net of $3,664.93.

The Annals of Internal Medicine for the calendar year showed a gross cost of $17,902.46 and a gross income of $17,073.75, or a net deficit of $828.71, a great improvement over any previous year in the history of the Journal. The net advertising profit in the Journal was $2,263.46, which, together with the increased subscriptions, is responsible for the material reduction in the deficit for the Journal.

The following statements have been verified and audited completely by Mr. J. J. Sutton, Auditor.

E. R. Loveland, Executive Secretary
C. R. Jones, M.D., Treasurer

AMERICAN COLLEGE OF PHYSICIANS, INC.
Balance Sheet, December 31, 1929

Assets

Cash in Bank and on Hand		$41,072.62	
Bonds Owned, (Schedule No. I)		26,820.60	
Accrued Interest on Bonds		524.79	
Inventory of Keys, Frames, Pledges, Etc.		563.60	
		$68,981.61	
Deferred Expenses for the Fourteenth Annual Clinical Session (Paid in Advance for 1930)		$ 403.11	
Furniture and Equipment	$ 3,154.80		
Less, Allowance for Depreciation	599.00	$ 2,555.80	
Total Assets			$71,040.52

Liabilities

Deposits by Candidates, Applications Pending		$ 1,570.00	
Deferred Income:			
Fourteenth Annual Clinical Session Advance Collections for Exhibits	$ 3,872.35		
Annals of Internal Medicine:			
Advance Subscriptions, Volume IV	562.10		
Advance Subscriptions, Volume V	12.00	4,446.45	
Total Liabilities			6,016.45
Excess of Assets Over Liabilities			$65,024.07

Funds

Endowment Fund (See Schedule No. II)	$ 5,300.00	
General Fund (See Schedule No. III)	60,624.07	$65,024.07

SCHEDULE No. I

INVESTMENTS
DECEMBER 31, 1929

Par Values		*Cost*
$ 1,000	City of Montreal 5s, 1956	$ 1,071.30
500	Oklahoma Gas & Electric Co. 6s, 1940	487.50
5,000	Province of Ontario 4½s, 1933	4,925.79
1,000	Province of Ontario 5s, 1942	1,052.26
3,000	Steelton, Penna., Paving 4½s, 1933	3,071.25
1,000	Township of Cheltenham, Montgomery Co., Penna., 4½s, 1943	1,000.00
10,000	City of Philadelphia 4½s, 1979	10,225.00
5,000	Canadian National Railway 5s, 40 Year Guaranteed Bonds, 1969	4,987.50
		$26,820.60

SCHEDULE No. II

ENDOWMENT FUND, PRINCIPAL
FOR THE YEAR ENDED DECEMBER 31, 1929

Balance, January 1, 1929	$ 4,100.00
Life Membership Fees Collected During the Year Ended December 31, 1929	1,200.00
Balance, December 31, 1929	$ 5,300.00

SCHEDULE No. III

GENERAL FUND, PRINCIPAL
FOR THE YEAR ENDED DECEMBER 31, 1929

Balance, January 1, 1929	$40,461.68
Net Income for the Year Ended December 31, 1929 (Schedule No. IV)	20,162.39
	$60,624.07

SCHEDULE No. IV

GENERAL FUND, INCOME AND EXPENSES

FOR THE YEAR ENDED DECEMBER 31, 1929

INCOME

Annual Dues	$22,883.00
Initiation Fees	18,765.00
Interest on Bank Deposits	1,373.67
Income from Bonds Owned	743.68
Income from Endowment Fund	282.00
Profit from Sales of Keys, Pledges, Frames, etc.	437.64
Receipts from 1927-28 Year Book and Supplement	9.50
Receipts from Annals of Clinical Medicine	58.95
Total Income	$44,553.44

EXPENSES

Thirteenth Annual Clinical Session:

Expenses:		
Salaries	$ 3,237.43	
Communications	329.83	
Stationery and Office Supplies	115.21	
Printing	1,471.77	
Traveling Expenses	1,963.71	
Honorarium	50.00	
Entertainment	987.20	
Advertising	479.45	
Reporting	378.65	
Publicity	250.00	
Badges	205.00	
Miscellaneous	316.32	$ 9,784.57
Deduct:		
Exhibits	$ 4,979.49	
Guest Fees	988.00	
Banquet	152.15	6,119.64
Net Expenses		$ 3,664.93

Annals of Internal Medicine:

Expenses:		
Salaries	$ 3,893.07	
Communications	727.64	
Printing	13,107.80	
Traveling Expenses	40.00	
Miscellaneous	133.05	$17,902.46

Deduct:					
Subscriptions:					
Volume I	$ 117.40				
Volume II	560.27				
Volume III	14,131.55	$14,809.22			
Advertising:					
Volume II	$ 1,301.74				
Volume III	961.72	2,263.46			
Stationery and Office Supplies		1.07	$17,073.75		
Net Expenses				$ 828.71	
Forward				$ 4,493.64	$44,553.44
Executive Secretary's Office:					
Expenses:					
Salaries		$ 7,653.34			
Communications		913.88			
Stationery and Office Supplies		661.09			
Printing		1,622.47			
Rent and Maintenance		3,119.74			
Traveling Expenses		1,599.34			
Annual Audit		350.00			
Miscellaneous		154.92	$16,075.68		
Treasurer's Office:					
Expenses:					
Salaries		$ 360.00			
Communications		20.00			
Stationery and Office Supplies		12.00			
Traveling Expenses		53.00			
Annual Audit		125.00			
Premium on Surety Bond		125.00			
Miscellaneous		15.00	710.00		
Annals of Internal Medicine Distributed Free to Life Members				54.00	
1929-1930 Directory (Cost of Production and Distribution)				2,714.27	
Depreciation on Furniture and Equipment				308.31	
Loss on Equipment Traded in				35.15	$24,391.05
Net Income for the Year, General Fund					$20,162.39

OBITUARY

In the death of Dr. Lawrence Litchfield, on January 16, 1930, western Pennsylvania has lost one of its outstanding figures in Internal Medicine, a loss which will also be felt by the profession generally and by the various medical organizations to whose deliberations he has for long been an esteemed and valued contributor.

As a Fellow of the American College of Physicians since 1922 and Governor for the State of Pennsylvania, he has contributed a great deal to the work of the College.

A short time ago Dr. Litchfield, who had been in failing health for several years, retired from practice. This was made the occasion for a testimonial dinner by approximately 150 friends who gathered to do him honor on the evening of December 6, 1929, at the Pittsburgh Athletic Association. He was presented with a handsome silver memento by the toastmaster, Dr. Edward B. Heckel. Among the speakers were Dr. William S. Thayer, of Baltimore, Md., and Dr. William S. Sharpless, of West Chester, Pa., President of the Pennsylvania State Medical Society.

At the time of his death of coronary thrombosis, he was living at the home of a relative in Chestnut Hill, Philadelphia.

Dr. Litchfield was born in Grand Rapids, Mich., a son of General Allyne Cushing Litchfield and Susan Cornelia Carver, a descendant from Robert Carver and William White of the Mayflower.

He was a graduate of Harvard University and the Harvard Medical School, from which he graduated in 1885, and the Bellevue Hospital Medical College of New York University.

Dr. Litchfield married Ethel Herr Jones of Pittsburgh in 1898. He traveled extensively in Austria and Vienna and other European medical centers, and was the author of numerous theses on medicine. During the war, he served as Commander Major in the Red Cross and was Chief of Medical Service at Camp Lee, Virginia, and at Camp Grant, Illinois.

He was a practicing physician in Pittsburgh since 1889. Dr. Litchfield was staff physician at the West Penn Hospital, Pittsburgh Hospital and Pittsburgh Hospital for Children, and Consultant at the Pittsburgh Eye and Ear Hospital, St. John's Hospital and St. Joseph's Hospital.

Dr. Litchfield was former President of the Pennsylvania Medical Society, and was a member of the Association of American Physicians and former President of the Pittsburgh Academy of Medicine, Allegheny Medical Society, and the College of Physicians of Pittsburgh. He was a member of the executive committee of the International Tuberculosis Congress in 1908 and the International Congress of Hygiene and Demography in 1910.

Besides his wife, he leaves two daughters, Baroness Van Boetzelaer (Ethel Carver Litchfield) and Margaret Litchfield, and a son, Thomas; a sister, Mrs. Myra French, of Ripley, N. Y., and a brother, Lucius Carver Litchfield, New York City.

—Submitted by E. Bosworth McCready, Governor for western Pennsylvania.

Dr. Samuel K. Pfaltzgraff, (Associate), York, Pa., died November 22, 1929, of coronary thrombosis; aged 65.

Dr. Pfaltzgraff received his medical degree from the University of Maryland School of Medicine and College of Physicians and Surgeons in 1886. He had been Dermatologist to the York Hospital since 1920. He was an ex-President of his county medical society, a member of the Pennsylvania State Medical Association, a member of the American Medical Association and an Associate of the American College of Physicians since 1923.

Dr Burt Wilbur Carr, (Fellow), Washington, D. C., died January 13, 1930, of cerebral hemorrhage, aged 54.

Dr. Carr graduated from the Dartmouth Medical School in 1900. He was in general practice from 1900 until 1918. He became a Captain in the Medical Corps of the U. S. Army during October, 1918, and then Surgeon in the Reserve Corps of the U. S. Public Health Service from 1919 to 1922, at which time he was detailed to the U. S. Veterans' Bureau. He served in the Medical Service as Chief, Occupational Therapy and Physiotherapy Sub-Division, as well as Editor of the U. S. Veterans' Bureau Medical Bulletin.

Dr. Carr was a member of the American Medical Association, the New Hampshire Medical Society, the Association of Military Surgeons of the United States, and had been a Fellow of the American College of Physicians since 1928.

Dr. Harold Cedric Bean (Fellow), Portland, Oregon, was born in Oregon in 1889. He received his bachelor's degree at the University of Oregon and his M.D. at Johns Hopkins University in 1916. His death on January 1, 1930, was a shock to the profession and his friends for he had been unusually well up to December 25, when he was operated upon for an ulcer in the lower third of the duodenum. A former operation had left many adhesions and localized peritonitis developed.

He was prominent in medical activities in Portland and in the state. He was a member of the State Board of Health and Assistant Professor of Medicine in the University of Oregon Medical School. He had achieved unusual prominence in his chosen field and was beloved by his colleagues.
—Furnished by T. Homer Coffen, M.D., Governor, Portland, Oregon.

Lucius L. Button (Fellow), Rochester, New York, died December 30, 1929. Dr. Button was born in Norwich, Connecticut September 11, 1869. He graduated from Sheffield Scientific School Yale University, Ph.B., in 1892; from New York Homeopathic Medical College and Hospital, M.D., 1895.

He then came to Rochester as an intern at the Rochester Homeopathic Hospital for two years and since that time had been engaged in his practice in this city. During all of these years he occupied various positions on the staff of the Rochester Homeopathic

Hospital, at present the Genesee Hospital, and served several years as an Attending Physician. For the last few years he had been a Consulting Physician at the hospital. For thirty years he had been a special examiner, employed by the Health Bureau, of backward, deficient, incorrigible and truant children.

He was a member of the following societies:

Monroe County Medical Society
New York State Medical Society
American Medical Association
Rochester Academy of Medicine
Monroe County Homeopathic Medical Society
Western New York Homeopathic Medical Society
American Association for the Study of the Feeble Minded
Association for the Study of Infantile Mortality

He was elected to the Fellowship of the American College of Physicians February 25, 1920.

Dr. Button was held in the greatest esteem by his colleagues and was especially beloved by his patients. He presented in his life the best type of the family physician.

—Furnished by David B. Jewett, M.D., Rochester, N. Y.